ECSTF
Electricity Conservation
& Supply Task Force

TOUGH CHOICES:

Addressing Ontario's Power Needs

Final Report to the Minister
January 2004

ECSTF
Electricity Conservation
& Supply Task Force

January 9, 2004

The Honourable Dwight Duncan, MPP
Minister of Energy
4th Floor, Hearst Block
900 Bay Street
Toronto, Ontario
M7A 2E1

Dear Minister:

The Electricity Conservation & Supply Task Force *(ECSTF)* has the honour of presenting its report to you in accordance with the mandate and terms of reference set out for its creation on June 27, 2003.

The recommendations in our report represent a broad consensus on changes that need to be made if the Ontario electricity industry is to successfully meet the challenge of a growing gap between future demand and supply. While not all members of the Task Force agree with all the recommendations, all members concur with the basic findings and the general directions that have been suggested.

The Task Force was privileged to have advice from over ninety experts, as well as access to staff in many organizations. We would like to express our appreciation to the many participants and presenters who contributed to our understanding of the issues and challenges currently faced by the Ontario electricity sector.

Respectfully submitted,

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Courtney Pratt - Chair of the Task Force

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Notes:

- From July to November, the Task Force was co-chaired by Peter Budd (Powerbudd LLP) and Gunars Ceksters.
- John O'Toole (MPP for Durham) was a member of the Task Force until October and Ron Osborne (then President and CEO of Ontario Power Generation) was a member until November.
- Michael Lio (Executive Director of the Consumers Council of Canada) participated on the Task Force starting in August.
- Donna Cansfield (Parliamentary Assistant to the Minister of Energy) and Richard Patten (Parliamentary Assistant to the Minister of Education) participated starting in October.
- Howard Wetston (Chair, Ontario Energy Board) participated in many Task Force sessions, but was not a voting member.
- Don MacKinnon, President of the Power Workers' Union, was a member of the Task Force and supports much of its work, but based on his concern that the recommendations with respect to coal and gas fired generation were insufficiently strong, declined to sign the Final Report.

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OUR TERMS OF REFERENCE

The Electricity Conservation and Supply Task Force will:

Provide an action plan outlining ways to attract new generation and identifying mechanisms for demand side management. The plan will be based on principles of security of supply, adequacy, affordability, reliability, environmental soundness and the competitiveness of the Ontario economy.

Identify any barriers to the development of long-term electricity supply and conservation, and recommend solutions.

Make recommendations on how to enhance the reliability and responsiveness of Ontario's electricity grid.

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Executive Summary

Ontario faces a looming electricity supply shortfall as coal-fired generation is taken out of service and existing nuclear plants approach the end of their planned operating lives. Early action is needed to ensure that Ontarians continue to enjoy an affordable and reliable supply of power and that electricity prices in the province remain competitive with prices in jurisdictions with which Ontario competes for investment and jobs.

The Electricity Conservation and Supply Task Force was established in June 2003 to develop an action plan for attracting new generation, promoting conservation and enhancing the reliability of the transmission grid. The Task Force consisted of nineteen leaders from all parts of the electricity industry, including representatives of consumers, workers and environmental groups. The Task Force met weekly, and heard presentations from nearly 100 experts representing different companies and stakeholder organizations. We heard and debated a wide range of options from "stay the course" to "close the market and go back to regulated prices".

The Task Force concluded that the market approach adopted in the late 1990's needs substantial enhancement if it is to deliver the new generation and conservation Ontario needs, within the timeframes we need them. Major changes in the energy economy and in public policy have undermined the viability of the original market design.

The four most important changes have been (1) the demise of the merchant generation and related financial markets following the collapse of Enron and other energy traders (2) the increase in the level and volatility of natural gas prices, which many experts believe will continue to at least the end of the decade (3) the Government's commitment to phase out coal-fired generation by 2007, and (4) the Government's commitment to keep all its generation assets in public ownership, which necessitates a review of the Market Power Mitigation Agreement and the role of Ontario Power Generation.

The Task Force determined that its action plan should be built from the ground up, starting with "a plan that works for consumers". The Task Force heard that consumers want and need stable prices that reflect the true cost of power, as determined by an independent regulator. The Government has already instructed the Ontario Energy Board to report on an appropriate price determination process by early 2005. The Task Force recommends that the OEB and the Minister consider a blended price approach for default supply customers which takes account of the low marginal cost power from OPG's "heritage assets", as well as power from long term contracts and the spot market. Greater price stability can be achieved by reducing the importance of the hourly spot market price in the calculation of final customer bills.

The Task Force recommends that consumers should continue to have the option of entering into supply contracts with energy retailers and wholesalers. Choice of provider was an important reform introduced by the Electricity Act of 1998. Retail competition will be helpful in driving innovation and conservation-oriented products and services. Consumer education and protection will be critical to the success of the retail market.

The Task Force calls for the creation of a "conservation culture" in Ontario. Again, education and improved co-ordination among providers will be critical. Specific recommendations include the adoption of new market rules that promote demand-side bidding by large volume customers, the removal of rules that financially penalize local distribution companies when they engage in conservation efforts, the promotion of technologies and rate offerings that facilitate time of use shifting, and the creation of a "conservation champion" to monitor and co-ordinate conservation efforts across the province. The Task Force believes that growth in peak demand can be reduced from 1.7 per cent per year (the average over the past ten years) to 0.5 per cent per year, which is in line with recently announced Government targets.

A key concept, going forward, is that demand reduction should be given the opportunity to compete with supply side alternatives, and be evaluated on a level playing field.

On supply, the Task Force recommends that the Independent Market Operator should determine adequate reserve margins and have the authority to ensure they are met. The IMO should also have responsibility for developing an integrated planning framework to provide more long-term certainty to investors and the marketplace.

The Task Force recommends less reliance on the spot market as a signal for new investment. There should, instead, be greater reliance on long term contracting between generators and large volume buyers. With the collapse of the energy trading business, there are few credit-worthy buyers willing to enter into long term contracts with new generation developers. There is therefore a need for a central agency, possibly the IMO, to take on the contracting function and ensure that investment projects are financable. Prudently incurred costs would be recovered from consumers.

The Task Force envisions that, over time, centralized contracting with generators would give way to more decentralized contracting, as six to eight "load-serving entities" emerge to provide the default supply service and seek out procurement contracts with generators and others.

The Task Force calls for quick action to implement the Renewable Portfolio Standard. Renewable generation will be a vital part of the future supply mix.

The Task Force recognizes the value of "distributed generation" and advances several recommendations that either remove barriers to such generation, or encourage it where there is a net system benefit.

The Task Force notes that, even with strong pushes on conservation and renewables, the demand-supply gap remains very wide. It will need to be filled in a way that recognizes the physical requirements of the electricity system and the unique attributes of the different generation types. Given the imperative of early action, there will need to be a certain amount of central co-ordination.

- Gas-fired plants can be operated as either peaking, intermediate or base load plants, can be built relatively quickly, and are relatively clean. However, with natural gas prices at current levels and expected to remain high, gas-fired generation (with the exception of cogeneration facilities and some distributed generation) is increasingly seen as best suited to meeting peaking and intermediate load needs. Using gas-fired generation to meet base load needs would likely result in higher and more volatile prices in Ontario than in markets with significant coal, hydro or nuclear baseload production, especially under the market pricing rules now employed in Ontario.

- Nuclear plants operate as base load facilities, with low operating costs. But nuclear investments, whether for refurbishment or new build, could involve major performance and financial risks that would need to be addressed.
- Imports from Manitoba, Quebec and Labrador could provide clean hydro power for intermediate and peaking purposes, but building the necessary transmission would be costly, and would take time.

The Task Force favours a diverse supply mix, and a balanced approach to filling the gap. It recommends that a process be put in place quickly to enable the negotiation and contracting of a range of new supply capacity to address the looming supply shortfall.

The Task Force finds that, to avoid major supply risks, coal plants may need to be kept in operation until adequate replacement generation and demand reduction measures are in place.

The Task Force notes the recent appointment of the OPG Review Committee chaired by the Honourable John Manley. It recommends to the Review Committee, and the Minister, that OPG be restricted to an investor of last resort role in any contracting for new "green-field" generation.

Private investment and risk taking should be the mainstay of the future power system, following competitive principles. Generators who were willing to make an early commitment to Ontario, either through NUG contracts or more recent investments, should not be penalized by the proposed new approaches on resource adequacy.

It is recommended that the transmission system be planned and managed as basic public infrastructure, facilitating new supply and competition. Expansion would be planned on a pro-active basis and cost-recovery would be through transmission rates, subject to OEB approval. Hydro One, as the principal transmitter, would be required to issue a long term plan for transmission development, and update it annually. The Task Force's recommendations represent a shift away from the merchant transmission approach underlying the present model.

The Task Force presents a number of recommendations that aim to clarify the roles and responsibilities of different players in the electricity industry, notably the IMO, the OEB, and the local distribution companies. The report discusses the roles of OPG and Hydro One, and also suggests possible directions for the future evolution of certain private sector entities, such as retailers and wholesalers.

The report notes the importance of addressing the need for skilled workers as the electricity industry goes through a major demographic shift. It also notes the need to support technological advance, and proposes that research and innovation be promoted through Centres of Excellence in Electricity and Alternative Energy Technology, and other mechanisms.

The Task Force believes that its recommendations, taken together, will shepherd the Ontario electricity sector through its current supply and demand challenges and lead to a sustainable electricity market in the future that enjoys adequate, affordable and reliable supply.

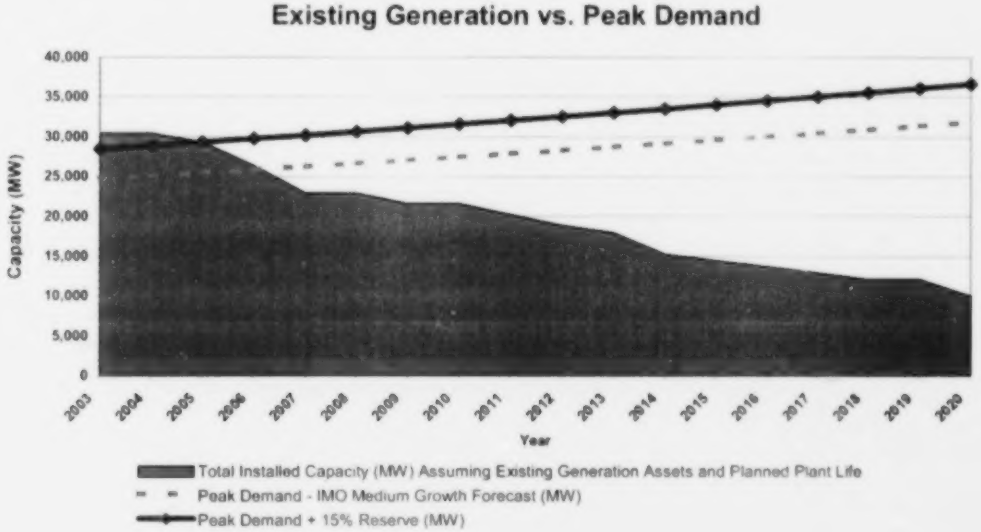
The Task Force made a number of tough decisions in arriving at the recommendations in this report. Much tougher choices will need to be made in the near term as specific investment and policy implementation decisions are made, within the improved framework we have proposed.

1. Process and Recommendations

1.1 The Challenge

Ontario faces a looming electricity supply shortfall in the years ahead as coal-fired generation is taken out of service and existing nuclear plants approach the end of their planned operating lives. Current projections suggest that, without new supply and substantial conservation efforts, Ontario could have insufficient power to meet its peak requirements by 2006. By 2014, the province would have only half the generation capacity it needs to ensure adequate and reliable electricity service.

FIGURE 1.A



The Electricity Conservation and Supply Task Force was established in June 2003 and charged with developing an action plan to address the province's need for an affordable, reliable and environmentally acceptable power supply over the period to 2020.

More specifically, the Task Force was mandated to recommend approaches to support conservation, attract investment in new generation, and enhance the reliability and responsiveness of Ontario's electricity grid. Many dramatic developments have occurred in the North American energy industry in the past five years. Given these changes, it became necessary to review the effectiveness of the province's existing policies and institutional arrangements for electricity, and to consider broad-based options for change.

Chapter 7 describes what has changed since the introduction of the Energy Competition Act, 1998, and summarizes the Task Force's plan to move the Ontario electricity sector toward a sustainable future.

During the course of the Task Force's deliberations, a 'blackout' occurred that affected a significant area across the North Eastern grid network. A number of panels were tasked with investigating the event and making recommendations. While the present Task Force has not been specifically directed to consider the recommendations of these other panels, we believe that the proposals we are making will result in the creation of a more robust Ontario electricity network that will be able to better respond to such external events should they re-occur in the future.

1.2 What We Heard

The Task Force met thirty times, and had detailed discussions with over 90 individuals and organizations representing all sectors of society, including residential consumers, small business, the farm community, large industry, environmental groups, voluntary organizations, labour organizations, members of the financial community, energy producers, electricity retailers and wholesalers, electricity distributors and transmitters, regulatory authorities and government organizations.

We found wide recognition that the province faces enormous challenges as it attempts to maintain an adequate and reliable power supply, while ensuring affordable and competitive electricity and a clean and safe environment.

The way in which the people of Ontario produce and use power will undergo a revolution within the next 20 years. In fact, by 2020, about two-thirds of the province's existing electricity generating capacity will have reached the end of its planned operating life.

We found a wealth of talent and enthusiasm for meeting the challenge. This is not a challenge the energy industry can meet alone. It will take a broad partnership that includes all consumers, producers and interest groups. And, as our report suggests, it will take determined and consistent leadership from the Government.

We found support for an electricity sector that is based on competitive principles. While consumers want stable and affordable prices, they appreciate that competition is needed to ensure good management, and keep downward pressure on costs and prices. There is general agreement that the old Ontario Hydro monopoly should not be recreated, and understanding among consumers that artificially low prices are a major disincentive to investments in both conservation and new supply.

Some of the people we met argued persuasively that what is required is a clear commitment from the Government to a market-driven electricity system. The Task Force recognizes that private initiative, driven by clear price signals, must play a central role in addressing Ontario's power needs and our action plan provides advice on ways to make those signals clearer and more effective.

However, we also heard that a market-driven system alone is unlikely to deliver the new generation and conservation Ontario needs within the timeframes we need them, and at acceptable prices. Major changes in the energy economy and in public policy have undermined the viability of the market that was adopted in the late 1990s.

Potential developers of generation are having great difficulty financing new investment. The merchant generation model was built on the assumption that energy traders like Enron would take on financial risks and provide the power purchase commitments that generation investors need to be able to finance their projects. This investment model fell victim to the collapse of the energy trading business after 2001.

Equally important, there has been a shift in the prevailing view about natural gas prices and availability. Prices have risen dramatically and continue to be volatile, and the adequacy of the North American gas supply over the medium term is being questioned. As a result, energy market experts no longer see natural gas as a stable and affordable fuel that will increasingly be chosen for new baseload generation. Natural gas-fired generation offers a number of advantages compared to other power sources, including shorter lead-times, lower capital costs, relatively few emissions and easier siting. Despite these advantages, higher gas prices mean that gas fired generation will tend to be used primarily for meeting intermediate and peak power needs.

Changes in public policy also make it more difficult to rely on pure market based solutions in the near term. The Government sees the health and environmental consequences of burning coal with existing technology as unacceptable and plans to phase out Ontario's 7500 MW of coal-fired generation by 2007. Consequently, the need for replacement power in the near term is immense. Some members of the Task Force believe that the phase out poses large economic costs and that the environmental benefits can best be achieved by other means.

A second important policy change is the Government's commitment to maintain public ownership of its existing generation assets. This commitment makes it necessary to reconsider the plan to gradually "de-control" the assets of Ontario Power Generation, and to re-evaluate the role of OPG in the evolving market structure.

Reliable electricity supply and competitive power prices are essential to the maintenance of the jobs and standard of living we enjoy in Ontario. We heard that, without a change in our approach to the electricity market, investment could go elsewhere, and the health of our economy could be put at risk.

1.3 Our Approach

The Task Force has identified a wide range of barriers to investment that need to be addressed. We have concluded, on balance, that relying on market signals alone is simply too risky an approach to take, given the potential consequences of failing to achieve the needed early investments in new supply and conservation.

That said, we fully support the principles of competition and consumer choice. Competition and choice are essential if we hope to achieve an efficient and responsive electricity sector. Ontarians need comfort that the looming supply gap will be addressed, but they also need comfort that the electricity system that is developed going forward remains workable, fair and efficient.

The action plan we are proposing is designed to support and accelerate the development of a competitive power supply market in Ontario. Given the economic and policy changes described above, and the long lead times for supply side investments, we have concluded that Ontario's competitive electricity system will evolve most effectively if there are complementary planning and oversight mechanisms to ensure that the needs of Ontario consumers are met.

While many of our recommendations address the province's immediate requirements, we have also considered where Ontario should be heading in the longer term. Appendix 1 describes what we have called a "desired sustainable state" . It is a collection of qualitative statements about the type of electricity system Ontario should strive to create in the long term. Our recommendations were driven by the need to arrive at practical solutions, not by a theoretical model or vision. And our mandate did not permit us to go into all topics on the list. Nevertheless, Appendix 1 may provide useful context and a general sense of how the Task Force looked at the "big picture".

1.4 Principles Underlying Our Action Plan

The Task Force's terms of reference establish the principles that inform our action plan: security of supply, adequacy, affordability, reliability, environmental soundness, and preservation of Ontario's economic competitiveness. We have followed these principles in putting together our recommendations to attract new investment, promote conservation and demand shifting, protect consumers, provide reliable high quality power, improve air quality, and provide competitively priced power for all consumers.

Several other principles became important as our work proceeded. It became clear that the Government would need to move quickly, and that, in a number of cases, the ability to implement recommendations quickly would be an important criterion in deciding which option the Task Force should recommend.

Second, we became increasingly aware of the need for a comprehensive approach that links, and balances, a number of different issues. The electricity sector is an extremely complex one, and it is difficult to change one part of it without triggering a flow of necessary changes to other parts. For example, it would be difficult to address investment and conservation without also considering the structure and role of electricity prices. Changes must be clear and understandable, and they must add up to a consistent whole. This is one reason why we found our task so challenging.

Third, we believe that the action plan should draw all Ontarians into the solution. The Government needs to move quickly to engage all consumers, producers and interest groups. Everyone will need to play their part. The supply gap is not something that can be left to the government to solve. In recognition of this, we make a number of recommendations on appropriate roles for different organizations and groups, including consumers and the private sector. We also stress the importance of developing new partnership models for program and service delivery.

The balance of this chapter summarizes our recommendations.

1.5 A Plan that Works for All Electricity Consumers

The Task Force met many experts and spent many hours considering the nature of the electricity prices and offerings that should be available to consumers. We heard that consumers want and need stable, predictable prices. We also heard that consumers recognize the need to eliminate subsidies and to pay the "true cost" of power, that they want the means to be able to understand and manage their electricity bills, and that many consumers want to be able to choose their electricity supplier. Business customers made it clear they need reliable, affordable power in order to remain competitive.

Consistent with our long term vision, and as described more fully in Chapter 3, we recommend as follows:

Stable electricity prices

1) Consumers should have access to a reliable default supply of electricity at stable prices that reflect the true cost of power, as determined by the Ontario Energy Board.

Retail access

2) All consumers should continue to have the option of entering into supply contracts with energy retailers and wholesalers.

Default supply pricing

3) As part of its mandate to develop new mechanisms for setting default supply prices in the future, the OEB should consider a blended price approach which reflects the cost of power from OPG's existing generating facilities (also referred to as "heritage power") and long term contracts, as well as the costs of power from shorter-term contracts and the spot market. Spot markets should not be the primary determinant of electricity prices for most consumers in Ontario.

Consumer information

4) Ontario should develop a comprehensive and coordinated approach to providing consumers the information they need to understand how the electricity market affects them and what they can do to control their energy costs. Government, local distribution companies, retailers, non-governmental organizations and others will need to be involved. The effectiveness of this program should be monitored on an ongoing basis.

5) In designing default supply prices, the OEB should ensure that such arrangements do not unduly impede the development of retail competition.

Peak and off-peak rates

6) Consumers who invest in smart meters should be offered rates that reflect differences in the cost of power between peak and off-peak periods.

Accountability

7) Consumers want public institutions that vigorously defend and promote the public interest and protect taxpayers' dollars. Oversight agencies (notably the OEB) should ensure that regulated entities (such as Hydro One and the local distribution companies) use processes, procedures and rate structures that deliver required investments and are accountable, transparent and fair across ratepayer groups.

1.6 Encouraging Conservation

Conservation measures are sometimes the cleanest and cheapest way to address Ontario's power needs. They can make a meaningful contribution toward reducing the need for new generation plants. We heard about a number of procedures and rules that work against conservation, and should be changed. For example, local distribution companies, despite being well placed to promote conservation, are in effect penalized for doing so. We note that the Government has already terminated the 4.3 cents per kWh price freeze, a move which we fully endorse. We heard that there may be systematic underinvestment in conservation because the benefits associated with conservation do not accrue solely to the individuals and entities that carry out the conservation measures. As with supply initiatives, support needs to be targeted at conservation measures that deliver results in the most cost-efficient manner. Our recommendations on conservation and demand management are as follows:

Conservation culture

1) Ontario needs to create a conservation culture that delivers cumulative and sustainable improvements in energy use and demand response. Ontario's long-term plan for electricity should include a comprehensive conservation strategy, with clear targets, reflecting a full analysis of the costs and benefits of conservation.

Wholesale market for demand response

2) The IMO should introduce market rule changes and systems to facilitate increased demand response in the wholesale energy market.
3) The IMO market rules should enable demand response capacity to bid into, and be recompensed by, any capacity market developed in Ontario, on the same basis as supply capacity.

Load shifting

4) Consumers should be encouraged to shift consumption from periods of high demand and high prices. In order to achieve this, they will need both the incentives in terms of differentiated prices and the technology in the form of smart meters.

Benefit sharing

5) Retailers, energy service companies and local distribution companies should be given benefit sharing opportunities to encourage them to invest in and market new technologies and services in order to help consumers reduce consumption and shift their power use from periods of high demand and high prices.

Cost recovery

6) Local distribution companies and transmitters should be compensated under appropriate regulatory oversight whenever they invest directly in demand side management, or work with private sector companies to facilitate it. They should also be compensated for revenue loss resulting from conservation. This is currently done in the natural gas industry.

7) Local distribution companies should evaluate proposed conservation initiatives on an equal basis with new supply options and distribution investments.

Private sector and NGO roles

8) The private sector has a key role to play in developing and marketing conservation solutions and should be encouraged to provide conservation services at both the retail and wholesale level. The private sector should be recognized by the OEB as an alternative to LDC delivery of conservation measures.

9) The voluntary sector and other non-governmental organizations should have a role in delivering conservation solutions directly to Ontario homes, farms and businesses.

Government's role in conservation

10) Governments should contribute to enhanced conservation in a variety of ways, including through tax incentives, the development of energy efficiency standards and reducing their own electricity use.

11) Education is key to ensuring effective implementation of energy conservation programs. A consistent message needs to be given across Ontario, encouraging conservation and providing all stakeholders with an understanding of available programs and how to use them.

Conservation Champion

12) A conservation champion should be created to monitor and coordinate conservation activities and serve as the focal point for a conservation culture in Ontario.

OEB review of Demand Side Management

13) The Task Force endorses the process currently under way at the Ontario Energy Board which is expected to provide more detailed advice to the Government in the spring of 2004 on the appropriate organization and funding of conservation in Ontario.

1.7 Ensuring Adequate Supply

Ontario urgently needs investment in new generation and transmission capacity. In light of the major changes that have occurred in the North American energy markets in the past few years, Ontario needs increased Government leadership and more coordinated supply and demand responses if it is to secure the needed investment.

There is currently a lack of credit-worthy power buyers and traders able and willing to enter into the long-term contracts that generators need in order to finance their investment projects. In addition, major supply options often have long lead-times. The spot market cannot be the primary mechanism for attracting investment in new supply to the Ontario market.

Due to the severity of the situation, several transition measures are necessary in the near term. These measures must be designed in such a way that they support the development of a well-functioning contract-based market over the longer term. These contracting issues, and the recommendations to which they lead, are discussed in Chapter 5. Our recommendations are as follows:

Transition measures

1) Ontario should move toward an electricity sector based increasingly on longer term contracts among multiple buyers and multiple sellers. Transition measures, outlined below, will be needed to accelerate the attainment of this ultimate goal.

Role of spot market

2) The spot market should continue to operate as a balancing market to ensure efficient resource utilization and dispatch.

Efficient market signals

3) The market should be structured so as to provide efficient signals for supply planning and demand response. The IMO should proceed with work currently underway that could lead to the introduction of a day ahead market. A spectrum of futures markets should also be developed.

A diverse supply and demand mix

4) The Government should provide guidance to the IMO on the desirable composition of supply and demand in the Ontario electricity system, in terms of diversity of generation mix, environmental criteria, regional supply needs, the role of imports, and other matters.

Integrated planning

5) The IMO should develop a long-term integrated system plan within the context of Government policy direction and in consultation with the Government, the Ontario Energy Board, potential private investors, major load customers, transmitters and others, to guide development of the supply and demand resources needed to meet the power needs of Ontario consumers.

6) Given the long lead-times associated with some of the supply options available to Ontario and recognizing the life expectation of certain major facilities, the IMO should project supply and demand trends for 25 years, rather than the current 10 years.

Ensuring adequate reserve margins

7) The IMO should determine adequate reserve margins for Ontario, consistent with international standards for adequacy

and reliability, and should be given the authority necessary to ensure these margins are maintained.

Ensuring new supply

8) As a transition measure, the Government should move quickly to designate, or create, an agency to provide the cost recovery certainty investors in new supply capacity currently require. With the appropriate governance and other safeguards to ensure against any possible conflict of interest, the IMO could be empowered to administer such measures. The measures available to the contracting party must be flexible enough to address the diverse timing and financing needs associated with various new supply and demand options. Any costs associated with this resource adequacy activity would be recovered from customers.

Diverse supply through an open process

9) The portfolio of contracts developed pursuant to the previous recommendation should reflect the short-term, medium-term and long term power needs of the market, as well as the Government's guidance on desired supply mix, and should be achieved through open and accountable processes. These processes should encourage investors and generation developers to bring forward a wide range of proposals to address Ontario's power needs, including conservation measures and distributed generation initiatives.

Appropriate oversight

10) The OEB should approve procedures for the contracting agency to use in carrying out its responsibility for ensuring adequate resources and should ensure that the process is in the public interest.

Developing load serving entities

11) Over time, the Ontario market should increasingly be based on contracts negotiated between multiple buyers and multiple sellers. To accelerate the development of a contract-based market, work should commence toward the development of parties (also known in the industry as "load serving entities") who would take on responsibility for acquiring electricity for customers who do not contract with retail or wholesale suppliers. We expect that there would ultimately be six to eight of these "load serving entities" to serve the province. Parties who might be able to play this role include wholesalers, retailers, and subsidiaries of local distribution companies.

12) As new load serving entities develop, the IMO should transfer energy contracting responsibility to them to as great a degree as

possible, while still ensuring adequate power supply, in accord with the desired supply and demand mix.

Fairness for existing private investors

13) The Task Force recognizes that the changes proposed in this report may commercially impact the private sector companies that were willing to make an early commitment to Ontario either through NUG contracts or more recent investments, and it concludes that measures should be developed to ensure that generators are not penalized as a result of the changes we have proposed regarding resource adequacy.

Streamlining siting and approvals processes

14) The siting and approvals processes for new generation and transmission projects should be streamlined and accelerated. Clear time limits should be built into approvals processes. A task force should be established to complete a review of Ontario regulatory and approvals processes, with a view to ensuring that processes in this province match best practices elsewhere.

Distributed generation

15) Ontario should move towards a market with rules that promote appropriate investment in distributed generation.

16) The Ontario Energy Board should assess the public costs and benefits associated with distributed generation solutions and ensure that projects which reduce system costs benefit from these cost savings.

17) Hydro One and the local distribution companies should help facilitate distributed generation. Any negative impacts caused by accommodating the increased market share of distributed generation or the potential stranding of transmission and distribution assets, should be taken into account by the OEB when considering rate applications.

18) Distributed generation facilities should be able to compete on a level playing field with other supply and demand side initiatives. The level playing field should include consideration of system benefits including security of local supply, energy efficiency and emission reductions, and local commercial and industrial competitiveness.

19) The construction of distributed generation facilities should not reduce the entitlement of a consumer to its share of any heritage power from existing OPG facilities available at stable, regulated rates. Similarly heritage power should not impede distributed generation projects where they provide positive public benefits.

20) The IMO's market rules should be amended to encourage load serving entities, when created, to purchase electricity produced by DG plants connected to local distribution systems.

21) Rate structures, market mechanisms and building codes and standards should be put in place to encourage and facilitate the use of emergency and stand-by generation as grid support during periods of high peak demand.

22) Ontario should expand its comprehensive tax incentive program to include a broader definition of distributed generation investment.

Promoting renewable energy

23) Renewable power technologies such as water, wind and biomass can provide a significant amount of new supply. In order to achieve the 2007 target of an additional 5% of the province's power from renewable resources (1350 MW), and its 10% target for 2010 (2700 MW), the Government should move quickly to implement its Renewable Portfolio Standard.

Phase-out of coal-fired generation

24) The Government should maintain existing coal-fired generation units as required until adequate new power supplies and demand reduction measures are in place. Having made the decision to close coal-fired generation, the Government should quickly develop generation, transmission and conservation alternatives including clean coal technologies, if the latter are feasible within the target emissions levels.

1.8 Enhancing the Responsiveness and Reliability of the Grid

The Task Force was mandated to develop recommendations on how to enhance the reliability and responsiveness of Ontario's electricity grid. Adequate and reliable transmission and distribution capacity will play a critical role in rebuilding the Ontario electricity system over the next 20 years. We are not convinced that a merchant transmission model based on congestion-based price differences provides adequate planning or incentive to build the grid Ontario needs. The August 14, 2003 Blackout has further focused public interest on the reliability question and the need for robust connections with neighbouring markets. Chapter 6 explains our recommendations, which are as follows:

Grid as essential infrastructure

1) The transmission grid should be treated as essential public infrastructure. Expansion and improvement of the shared grid, when determined by the OEB to serve the public interest,

should be paid for by customers through transmission rates determined by the OEB.

Regional market

2) Ontario should continue to work with neighbouring markets to eliminate barriers to trade in electricity and ancillary services. Continued participation in the interconnected regional market helps provide reliable and affordable power for Ontario.

Ensuring reliability and service

3) The OEB should set and enforce transmission and distribution reliability and service standards, taking into account the IMO's responsibility for overall system reliability and security, including administration and compliance enforcement for the IMO-controlled grid.

Proactive transmission planning

4) Within the context of the integrated system plan, Hydro One should develop a comprehensive long-term transmission development plan. In developing this plan, it should consult with generation developers, load customers, the IMO, local transmitters and other interested parties. The plan should extend out at least 10 years and should be updated annually. It should anticipate system expansion needs and address them in a proactive fashion.

Transmission as enabler of generation

5) In light of the urgent need to develop new provincial power supply, transmission should be a facilitator of new generation, not a barrier to it. Costs for transmission enhancements to incorporate new generation should be recovered through markets or through rates, to the extent justified by public interest benefit as determined by the OEB.

Grid connection for distributed generation

6) The OEB should issue guidelines that encourage the timely and economic connection of distributed generation facilities. Any resulting stranded transmission and distribution costs should be recovered from ratepayers.

1.9 More Effective Institutions

Ontario faces unique challenges and needs the institutions, people and knowledge to address them successfully. The Task Force heard that the roles and responsibilities of key players in the industry need to be clearly defined and respected if we are to provide a market environment that can attract investment.

The industry is entering a critical phase where massive supply additions and ambitious conservation efforts will be required. At the same time, the industry is facing a demographic challenge as many of the skilled men and women who run the system approach retirement. We believe that the electricity industry will be a challenging and exciting place to work. If we are to succeed in addressing the challenges we face, we need to attract and train the next generation of power workers.

Ontario also needs to be a leader in innovation. Other jurisdictions, most notably the United States, are making large investments in developing innovative approaches to conservation and the production of cleaner, reliable power, (including nuclear and clean coal technology). We need to do likewise.

Our recommendations are:

Clear accountability

1) The respective roles and responsibilities of the Government, the Ontario Energy Board, the Independent Market Operator, OPG, Hydro One and local distribution companies should be clearly and distinctly spelled out and communicated to the public.

Supporting research and innovation

2) Research and innovation are important aspects of building a leading-edge electricity sector in Ontario capable of developing creative supply and demand solutions to the Province's power needs. Government should work with industry and universities to support research and innovation in the electricity industry through Centres of Excellence for Electricity and Alternative Energy Technology and other mechanisms.

Addressing skills need

3) Governments, corporations, educational institutions and employees and their associations should work together to ensure that Ontario continues to have the skilled workers needed as the electricity sector goes through both major demographic change and the rebuilding of the province's electricity system over the next 15 years. The electricity industry needs to become a career path of choice for Ontario's youth.

Streamlined federal provincial regulation

4) The Government of Ontario should work with the federal government and its agencies to ensure consistent, streamlined and effective regulation. This applies in several areas, including nuclear regulation, permitting of wind projects on the Great Lakes, Kyoto compliance measures, and inter-provincial and international transmission.

Eliminating policy silos

5) The Government should adopt internal procedures to ensure that the importance of bringing on new generation and

transmission, and of promoting conservation, are given adequate recognition by all ministries and agencies.

Policy independence in interconnected market

6) Ontario should expand its electricity trade capabilities with neighbouring provinces and states, while maintaining its policy independence.

1.10 Addressing the Future Role of OPG

The Task Force heard frequently that the position of OPG in the Ontario market represents a serious barrier to investment and effective competition, because of both its dominant market position and its Government ownership.

The Government recently created the OPG Review Committee, chaired by the Honourable John Manley, to report to the Minister of Energy by March 15, 2004 on the role of OPG in the Ontario electricity market, the appropriate future structure of OPG, its corporate governance and senior management structure, and the potential refurbishing of Pickering A Units 1, 2 and 3.

The Task Force presents a number of recommendations which address the role of OPG in the evolving Ontario market, recognizing that the OPG Review Committee will also provide advice to the Government on some, or all, of these issues.

Primacy of private investment

1) OPG, as a Government owned entity, is perceived to enjoy an advantage in the market over other generators. As long as OPG remains the dominant generator, it should be limited to an "investor of last resort" role for projects that the private sector could undertake economically.

Partnering with private capital

2) OPG should partner with private investors to further develop its existing facilities where practical and economic.

Replacing the Market Power Mitigation Agreement

3) The current Market Power Mitigation Agreement can not be effectively implemented given the Government's commitment to ongoing public ownership. It is necessary to develop a simpler approach to address market power and provide price stability. The Government should initiate a process to develop a suitable substitute arrangement to address concerns over OPG market power. Long-term regulated contracts for "heritage power", reflecting the costs of power generated from most of OPG's waterpower and nuclear assets, may provide a means to reduce price volatility for all consumers and effectively remove that

supply from potentially unfair competition with private supply. Complementary measures would be needed as well to ensure OPG does not exercise market power with respect to its assets not covered by such contracts.

Addressing stranded debt

4) The Government's approach to stranded investment should be re-examined in the context of the development of mechanisms to replace the Market Power Mitigation Agreement.

Supply and price impacts of OPG restructuring

5) OPG's existing assets have a major role to play in maintaining a diverse, cost-competitive supply of power in Ontario. In considering the best use of OPG's assets, the Review Committee and the Government should take account of the impact of decisions about the future use of OPG's nuclear capacity, hydro assets and coal fired generation on Ontario's power supply mix and on the resulting supply and cost of power in Ontario.

In summary, our action plan provides:

- Ambitious measures to build a conservation culture.
- Reduced dependence on spot market prices to determine consumers' power costs and to attract the needed investment in new supply and conservation.
- Continuing retail choice.
- New contracting mechanisms for additional power supply capacity.
- The opportunity for a wide range of supply and demand initiatives to compete on a level playing field to meet Ontario's power needs.
- A diverse supply mix that is likely to include new renewables, natural gas fired generation, waterpower and nuclear power.
- A new emphasis on the transmission grid as essential public infrastructure connecting power producers and consumers.
- Clear accountability.

2. The Demand/Supply Outlook

2.1 Introduction

This chapter summarizes recent trends and the outlook for the supply of, and demand for, electricity in Ontario, in the absence of major new supply and conservation initiatives. While there is a wide range of opinion on specific issues, there is broad consensus about the fundamentals of the Ontario outlook.

The starting point for all projections is the IMO 10-year forecast, released most recently in March 2003. The IMO forecasts use sophisticated models which relate demand to weather, economic conditions and calendar events (such as holidays). The IMO model is based on 30 years of historical weather and demand data, as well as a consensus forecast of economic conditions. Where appropriate, it has been updated to reflect recent developments and policy decisions.

For some discussions, the forecasts have been extended a further 10 years, using straight-line trend calculations, as recommended by the IMO.

Chapter 5 addresses supply options in more detail.

2.2 Demand Growth Trends and Outlook

The demand for energy in Ontario continues to grow...

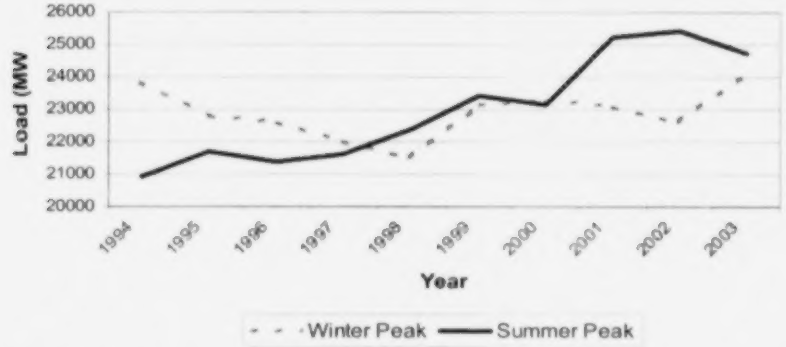
Ontario's thriving economy and growing population base have meant constant growth in the need for electricity. For the past ten years, the province's average annual growth in electricity demand has been approximately 1.4%. Peak electricity demand, which is key to determining capacity needs, grew at an average annual rate of 1.7% over the same period.

There has also been a swing in the timing of the highest peaks, with greatest demand now being found during the hot weather of summers, rather than as formerly, during cold winter months. Over the past decade, Ontario's summer peak increased 2.2% per year while its winter peak increased 0.4% per year.

The IMO's median demand forecast projects that energy consumption will continue to grow 1.1% per year, with peak summer demand increasing by 1.3% per year to 2013. By that time, summer peak demand in Ontario will exceed the winter peak by about 1,200 MW.

FIGURE 2.A

Highest Hourly Consumption (1994-2003)



...but at a slower rate than the economy is growing.

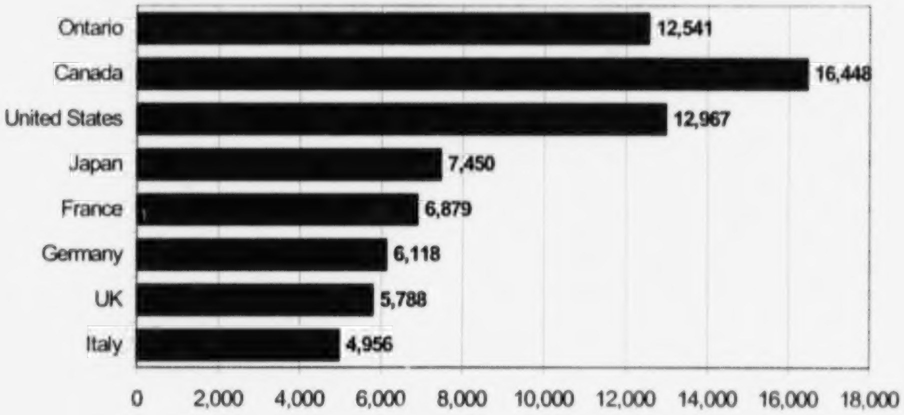
Even though the growth in energy demand does represent a challenge, it could have been worse. While peak demand grew by 1.7% annually over the last 10 years, Ontario's economy (as measured by GDP) grew by 4.3% per year in the same period. This means that Ontario's electricity intensity has been steadily improving; it now takes less power to produce the same value of goods and services.

Many factors have contributed to this improvement: consumers have shifted to natural gas for home heating, and purchased energy efficient appliances; many industries have improved their energy efficiency; builders have built or retrofitted buildings that are more energy friendly, and the provincial economy has undergone a shift from manufacturing to services.

Despite these improvements, Ontario's appetite for electricity remains typical for North America, which means quite high relative to many other advanced economies.

FIGURE 2.B

Net Electricity Consumption per Capita (in KWh), 2000



Source: US Energy Information Administration and UN World Population Prospects, Population in 1999 & 2000.

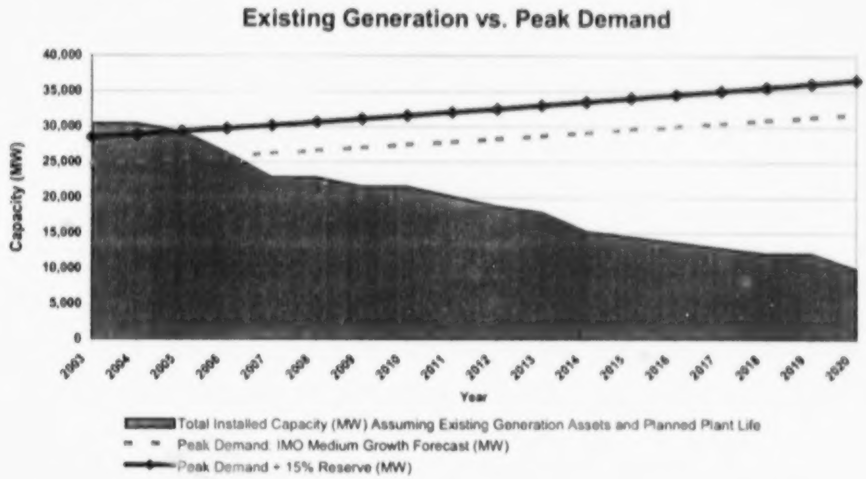
("Net consumption" is defined as generation, plus imports, minus exports, minus transmission and distribution loss.)

2.3 Demand Growth and Conservation Scenarios

By 2020, Ontario would need nearly 37,000 MW of supply capacity at its current pace of growth.

The IMO "medium growth" projection shows that annual peak demand will rise from just over 24,000 MW in 2004, to almost 27,000 MW in 2013. Including reserve requirements for the same time span, the figures rise from under 28,000 MW to over 30,000 MW. At the same pace of growth, peak demand would reach 32,000 MW in 2020 and, with required reserves, Ontario would require nearly 37,000 MW of capacity.

FIGURE 2.C



Demand reduction provides a clean, cheap way to help address the energy gap power needs.

Demand reduction offers some of the cleanest, cheapest and least risky ways to address our growing supply-demand imbalance. Ontario must take advantage of the many opportunities to do better.

What is attainable in Ontario? The answer depends on what mix of demand reduction and demand side management is employed, and how well it is supported.

As a baseline for comparison, the US Energy Information Administration projects that, over the period to 2025, electricity consumption in the United States will continue to grow at an annual average rate of 1.8%, roughly in line with recent experience. With GDP projected to grow at 2.5-3.0% per year over that period, that implies about a 1% improvement in electricity intensity each year.

California's experience shows how difficult obtaining long-term reductions can be.

California's conservation effort, initiated by wild fluctuations in the economics of electricity at the start of this decade reportedly, saved the citizens of that state over $600 million (US) in spot electricity purchases in the first 6 months of 2001 alone, when wholesale prices surged to over 30 cents (US). For 2002, weather-adjusted energy consumption was 6 per cent lower than in 2000, while average peak demand was down by almost 8%. Even with extensive conservation efforts, electricity consumption in California still grew 1.1% per year on an average annual basis over the last decade, only marginally slower than Ontario's record over the same period.

The U.S. National Association of Regulated Utility Commissioners has estimated that up to 40-50% of peak load growth over the next 20 years could be met by energy efficiency, price-response, and load management.

In Ontario, demand reduction programs could eliminate up to 1,350MW of peak demand.

A recent study by Navigant Consulting estimated that an emergency demand response program in Ontario could expect to produce 500-600 MW of demand reduction response. If the Province were to institute participation payments for large volume consumers willing to reduce demand when requested to do so, up to 750 MW could be achieved.

Other initiatives will have a permanent impact.

Other initiatives, including improved energy efficiency standards for equipment, appliances and buildings, smart meters combined with smart appliances, thermal storage systems and energy audits can make major contributions to improved energy efficiency and demand management.

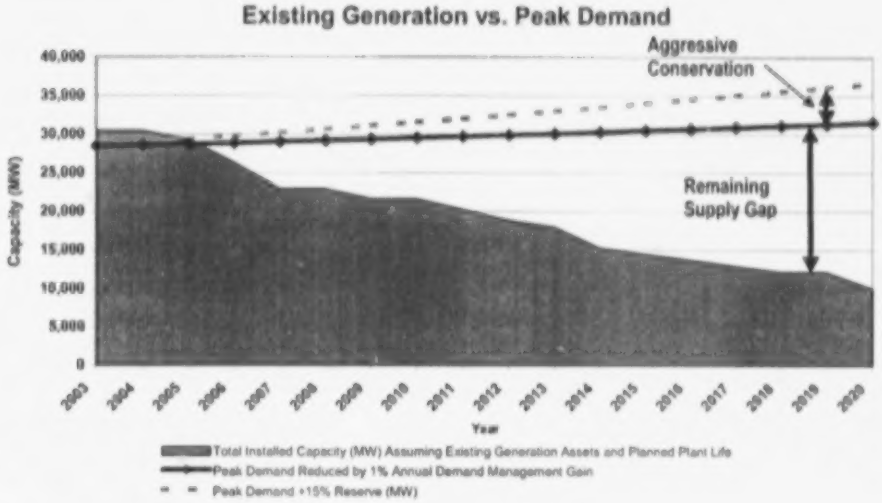
At the same time, there are forces pushing in the opposite direction. As our resource base gets increasingly depleted, mines get deeper and require more energy. Homes continue to get larger and summers hotter.

The Government has set an initial conservation target that will help to "raise the efficiency bar" in Ontario.

The Ontario government has committed to conservation gains equal to 5% of peak energy demand (1,350 MW) over the next 4 years. This initial target will help to "raise the efficiency bar" in Ontario. The Task Force heard from several groups that suggested, with correctly designed market structures and incentives, conservation can contribute considerably more to reduce overall energy usage during peak periods and shift consumption to off-peak hours.

For the sake of illustration, the figure below shows the effect of reducing summer peak demand growth in Ontario to 0.5% per year from the recent growth rate of 1.7% per year, roughly in line with the Government's target for the next four years.

FIGURE 2.D
DEMAND/SUPPLY BALANCE –

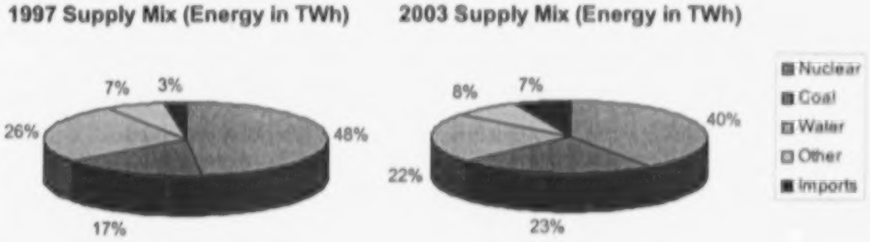


2.4 Recent Supply Trends

In 1997, the Ontario government decided to take seven nuclear reactors off-line to address critical maintenance and repair needs. This represented approximately 5100 MW of capacity withdrawn from the market. Before the removal of that capacity, nuclear generation accounted for roughly 48% of the provincial total electricity consumption. Following the lay-up, that figure dropped and stood at 40% at the start of 2003. Two of the laid up units have now been returned to service and the return of a third is imminent.

The removal of nuclear capacity from the market in 1997 meant a marked increase in the use of coal to meet required levels of energy production.

FIGURE 2.E

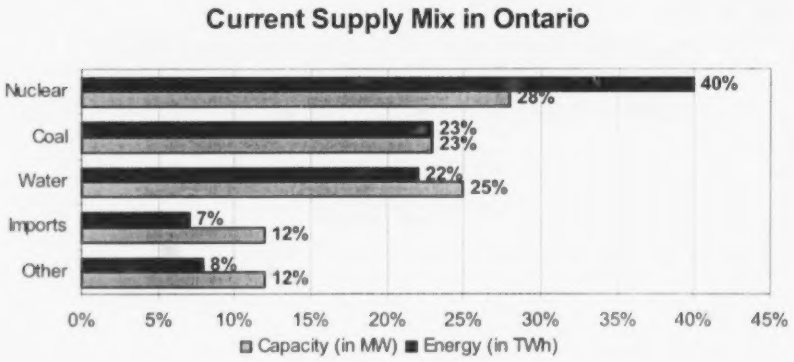

1997 Supply Mix (Energy in TWh) **2003 Supply Mix (Energy in TWh)**

Note: Other includes gas, wind, solar etc.

Imported power is currently important to the mix...

Currently, Ontario imports power to meet peak demand. The Province has approximately 4,000 MW of interconnected transmission capacity with other provinces and states. Imports were very low from 1991 to 1996 but then climbed again with the nuclear lay-up. In 2003, the province imported about 7% of its electricity supply.

FIGURE 2.F



While oil and gas and non-hydro renewables provide a growing share of capacity, their contribution to energy supply is much smaller, reflecting the fact that some of this capacity is used as peaking and intermittent power sources.

2.5 The Supply Outlook

The IMO reported in March, 2003, that supply should be adequate to meet demand until at least 2007...

The supply outlook has deteriorated significantly over the last 10 months. The IMO's 10-year outlook, released in March 2003, had indicated that the Province should have adequate supply to meet even high demand growth scenarios up until 2007, based on the following assumptions:

- 26 planned projects would come on-stream as planned, totaling over 8700 MW of capacity;
- 300 MW of price responsive demand would become available;
- all four Pickering A units would be returned to service; and
- the Lakeview coal-fired plant would be retired in April, 2005, but all other coal-fired plants would continue to run.

Specific supply increases were to include the addition of 4 generation plants between 2003 and 2007 (Bruce A units 3 and 4, and gas-fired plants being constructed by Atco and Imperial Oil), which would increase the system's capacity by almost 3,000 MW. In addition, nearly 600 MW of wind power was expected.

The IMO report also highlighted the increasing risk of relying on an aging generation infrastructure, and the fact that half of the existing capacity will need to be replaced or refurbished over the next ten to fifteen years.

...but there have been significant changes since then...

Since that report, many of the proposed gas-fired and wind power projects have been put on hold. While three nuclear reactors have returned to service, the findings of cost overruns and missed deadlines at Pickering have increased doubt about the timely return of the three remaining Pickering A units.

...so that a major shortfall is now expected.

In addition, the Government has committed to eliminate all coal fired generation by 2007. Coal accounts for 26% of the province's generating capacity. Since some coal plants are located close to major loads (such as Lakeview in the GTA), their replacement by more distant sources will create potential transmission problems, including congestion.

By about 2020, virtually all of the Province's existing nuclear plants will reach the end of their planned operating lives, and need to be refurbished, replaced, or retired.

Adjusting the IMO forecast with this information shows a projected shortfall in 2007 of 5000-7000 MW. If no new capacity or demand reduction measures are taken, the Province will be critically dependent on external sources of electricity, energy costs will be higher and more volatile, and reliability could be reduced.

Beyond 2007, the need continues to grow. Other than waterpower assets, the entire generation asset base will have to be rebuilt. This is both a challenge and an opportunity. Given the lead times involved, action is required now.

3. A Plan that Works for Consumers

The Task Force believes that a plan that works for all consumers (residential, commercial, agricultural or industrial) is one that—

- provides fair pricing to consumers
- supports mechanisms which allow for predictable and stable rates
- ensures reliable and adequate supply
- gives consumers the right to choose rate plans and electricity providers
- allows for a full flow of information to users of electricity
- ensures that consumers are protected from unethical or fraudulent behavior

The Task Force feels that price caps or freezes do not work in the consumer's best interest, since such solutions tend to discourage conservation and investment in new generation. As a result, the true price of electricity will rise and be absorbed by the either the taxpayers or, after the freeze is lifted, ratepayers.

3.1 Stable, predictable, affordable prices

Ontario's recent experiment with an open retail market failed...

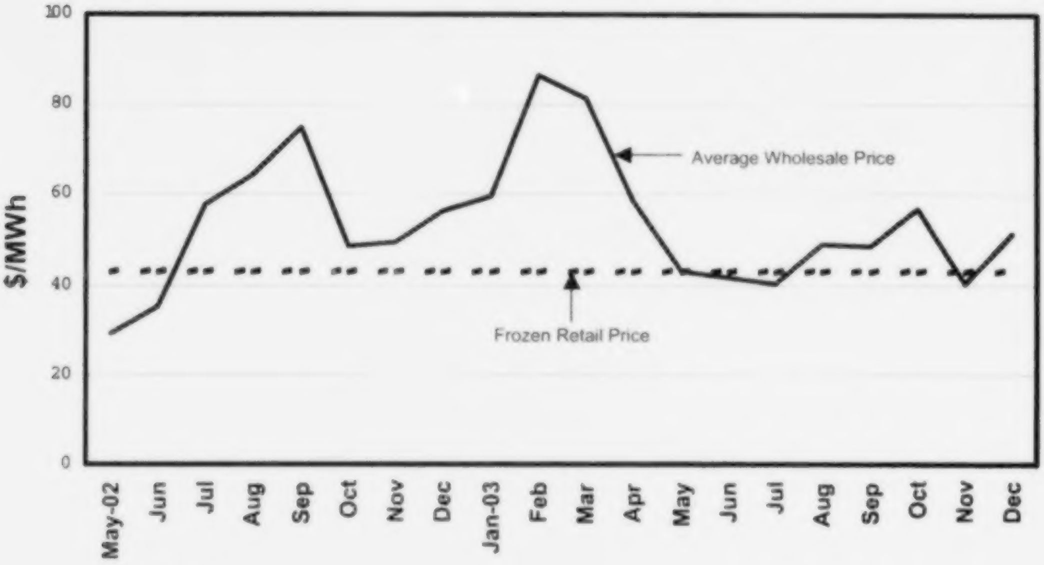
On May 1, 2002, Ontario's electricity market opened to both wholesale and retail price competition. Over the following 6 months, consumers faced an unforeseen and unacceptable level of price volatility. In response, the Government introduced legislation in December 2002, which created a 4.3c/KWh price cap on approximately 50% of the electricity used in the Province, retroactive to the market opening date.

...but the imposed rate freeze is only a temporary solution.

On November 25, 2003, the Minister of Energy announced a plan to set more realistic prices covering the period to April 2005. He also announced that the Ontario Energy Board would develop a longer-term plan to set regulated power prices for default electricity customers (those who continue to purchase electricity from their local distribution utility and do not sign on to a particular plan offered by an independent retailer).

FIGURE 3.A

ONTARIO WHOLESALE ELECTRICITY SPOT PRICES
(May 2002 – December 2003)



Source: IMO

3.2 Options for stable prices in the medium term

Letting the spot market determine prices is not the answer.

The Task Force was charged with developing an action plan to attract new generation and identifying mechanisms for conservation; the way electricity is priced is a key factor in both areas. We therefore began by recognizing consumers' need for stable and affordable electricity prices, and by reviewing some of the medium-term pricing options. The options we considered included:

1. Resumption of the spot price pass-through, with various smoothing approaches to shelter consumers from the month to month impact of spot price volatility;
2. Continuation of a provincially determined price, with the Province absorbing the associated risk;
3. A fixed rate, determined through a centrally run auction;
4. Local rates, determined by the load serving entities' costs of procuring their default supply.

Long-term supply contracts provide the best mechanism for ensuring price stability

The Task Force has concluded that each of the options can ensure price stability, but that the options involving contracting (options 3 and 4) are superior, as they also strengthen the market. Under these options, the buy side of the market becomes more organized, and there are counterparties who are able to sign longer term supply contracts with generators.

Such contracts would provide the collateral which investors need to secure financing for investments in new supply and demand management.

The Task Force recommends that "load serving entities" be established.

As our Recommendations make clear, we believe there is a need for a central agency to organize the procurement of default supply in the short term, and to offer a price to consumers that reflects the cost of the power. Over time, we believe there is an opportunity for other entities (load serving entities) to emerge to take on the responsibility for default supply, leaving the central agency as the default supplier of last resort. These load serving entities could be local distribution companies, energy wholesalers or new commercial partnerships.

We also see a need to continue to offer all consumers the price stability currently provided through the Market Power Mitigation Agreement. That protection should be provided through a simpler and more direct mechanism; such as Heritage Contracts similar to those in place in British Columbia and Quebec.

3.3 Retail Choice for Consumers

Electricity retailers play important roles in the energy market.

The Task Force considered the role retailers play in electricity markets. As intermediaries between the wholesale market and consumers, retailers can offer a wide range of products and services, including innovative pricing offers, green power and conservation incentives. They also provide risk capital and manage risk on behalf of the consumer.

Based on the experience of similar jurisdictions, only a minority of residential consumers are likely to choose retail electricity marketers in the near term. Even so, we believe that choice is an important principle and should be retained as part of the Ontario market design.

At the same time, the Task Force recognizes that large, unanticipated movements into and out of the default market could pose risks to the financial capacity of those who supply default customers. We therefore see a need for some restrictions on movement by consumers between default supply and the competitive market, particularly for large users.

3.4 Communication with Consumers

Giving consumers the information to understand the new market is critical.

We support a coordinated program that provides consumers with practical information on how the evolving electricity market affects them and what they can do to manage their electricity costs. There have been well-intended efforts in the past to provide such programs. Among the problems encountered:

- Lack of coordination among organizations involved
- Lack of resource commitment
- Lack of transparency
- Complicated and even contradictory messages.

To be effective, a communication program must provide the information consumers need in order to make effective decisions—information about:

- The true cost of power
- The options they have, such as choosing an independent electricity retailer, or investing in smart meters
- Their own consumption, and about how different pricing arrangements would affect their bills
- The importance of conservation
- Who they can go to for help, if needed.

In addition, electricity suppliers (retailers or default suppliers) must develop simple and easy-to-understand billing systems, as recommended by the Review of Ontario Electricity Bills. (presented March, 2003)

Such a program must involve, and be supported by, all stakeholders. That said, Local Distribution Companies should play a leading role in delivering this kind of program.

A long-term approach to consumer communication is required.

Achieving success will require clear definitions of the roles of the various organizations involved, committed resources, and transparency. The program must be sustained. While consideration should be given to having different strategies for different groups, the key messages must be consistent province-wide.

3.5 Consumer Protection

Experience with the transition to competitive energy markets in Ontario and elsewhere points to the need for effective consumer protection measures, as well as effective education. Consumers:

- Need to be assured that energy contractors meet accepted standards
- Need to be assured that energy retailers are licensed and regulated and that this is enforced
- Need to know where to turn when they have a problem
- Need fair and efficient responses

3.6 Getting There

The plan will require a changed regulatory framework.

A plan that works for consumers will depend on the alignment of private sector interests with public needs, and the responsible operation of public institutions. In particular, certain changes to regulatory organizations need to be put into place. These are discussed in a later chapter.

Related Recommendations

1. Consumers should have access to a reliable default supply of electricity at stable prices that reflect the true cost of power, as determined by the Ontario Energy Board.
2. All consumers should continue to have the option of entering into supply contracts with energy retailers and wholesalers.
3. As part of its mandate to develop new mechanisms for setting default supply prices in the future, the OEB should consider a blended price approach which reflects the cost of power from OPG's existing generating facilities (also sometimes referred to as heritage power and long term contracts, as well as the costs of power from shorter-term contracts and the spot market. Spot markets should not be the primary determinant of electricity prices for most consumers in Ontario.
4. Ontario should develop a comprehensive and coordinated approach to providing consumers the information they need to understand how the electricity market affects them and what they can do to control their energy costs. Government, local distribution companies, retailers, non-Governmental organizations and others will need to be involved. The effectiveness of this program should be monitored on an ongoing basis.

5. In designing default supply prices, the OEB should ensure that such arrangements do not unduly impede the development of retail competition.
6. Consumers who invest in smart meters should be offered rates that reflect differences in the cost of power between peak and off-peak periods.
7. Consumers want public institutions that vigorously defend and promote the public interest and protect taxpayers' dollars. Oversight agencies need to ensure that regulated entities use processes, procedures and rate structures that deliver required investments and are accountable, transparent and fair across ratepayer groups.

4. Delivering Sustainable Conservation

4.1 Introduction

As part of its mandate, the Task Force was asked to provide the Minister with an action plan identifying opportunities, recommendations and mechanisms for conservation. In this chapter, we consider the role that conservation can play in making Ontario's electricity system more efficient and reliable.

By conservation, we mean the range of activities that can be undertaken by consumers, utilities and others to reduce electricity consumption, use electricity more efficiently, or shift usage to other times.

Reducing overall electricity consumption and reducing system peak loads can be effective in addressing tight supply-demand conditions. In fact, conservation is often less costly, in terms of lifecycle costs, than supply options, and can provide faster and more flexible responses to changing market needs than adding supply.

Through improving codes and standards, Ontario is slowly becoming more energy efficient.

Managing energy demand means using energy more productively. Over the past 20 years, Ontario's energy productivity (for all fuels) has improved: economic output has grown faster than growth in consumption of energy. Some of the improvement has been due to structural changes in the economy (mainly the result of a relatively greater growth of new service-based businesses compared to energy intensive industries like steel or forest products that process raw materials, and a shift to producing higher value products in the energy intensive industries). We used less energy of any kind for more economic output. Considering only electricity, there was a marked difference in the productivity for this energy source during the last decade. Electricity productivity in Ontario improved strongly in the 1990s. By 2002, it had improved 31% from the level of 1992.

Notwithstanding these efficiency improvements, Ontario remains a relatively high per-capita energy consuming jurisdiction. An aggressive conservation strategy can play an important role towards balancing the demand-supply equation while contributing to system reliability.

Conservation can be as important as new generation in helping meet the gap between electricity demand and supply.

Conservation was supported by Ontario Hydro programs in the early 1990s, and is currently addressed through government regulation of appliance and building standards. Other efforts at conservation have been intermittent. The Task Force believes that long-term, sustainable conservation is an essential element in meeting the objectives of security of supply, adequacy, affordability, reliability and environmental soundness.

Given the supply challenge presented to the province over the next several decades, and the expectation that consuming less and shifting usage to off-peak periods will be needed for the system to balance, the goal should be nothing less than to create a "conservation culture" in Ontario.

4.2 What do We Mean by Conservation?

The term "conservation" can include both *demand-side management* and *demand response*. These terms refer to different means of influencing consumers to change their use of electricity, thereby reducing demand that would otherwise have to be met through increased supply.

Conservation programs can address total consumption or smoothing of the demand pattern.

Conservation Approaches	
Demand-Side Management (DSM)	**Demand Response (DR)**
• Using less energy • Using energy more efficiently	• Shift timing of energy use without reducing overall consumption • Move usage from peak to off-peak

To take the example of a dishwasher —using it less frequently is an example of demand side management; so is buying a more efficient unit that uses less electricity. Running the dishwasher during off-peak periods (e.g. overnight) would be an example of demand response.

Demand-side management is supported by a range of activities undertaken by local distribution companies, retailers or other service providers to enable consumers to reduce electricity consumption. They usually involve promoting the equipment and supplying the knowledge for consumers to use less electricity.

Examples include rebates for high efficiency appliances, consumer information campaigns, or long-term education to alter consumer behaviour.

Demand response mechanisms can be implemented in both the wholesale market (by the IMO) and in the retail market (by LDCs, retailers or other service providers). Wholesale market examples include real-time pricing and increasing dispatchable load. Retail market examples include time-of-use rates and smart meters, and direct load control programs like water heater control devices. Demand response can be undertaken actively by consumers in response to price, or it can be undertaken by others; for example, when an LDC turns down a block of water heaters using a remote means of load control.

4.3 The Rationale for Conservation

Why do we need a conservation strategy?

A frequently asked question is: why is there a need for conservation initiatives? If consumers can save by using less electricity, why do they not manage their own demand? The answer is that, for several reasons, Ontario's electricity market does not currently provide enough information and incentives to encourage conservation.

Because some benefits flow to the system as a whole, not the person who reduced.

The price of electricity does not include certain system, health, and environmental costs. This means that the consumer gains only part of the total benefit created by conserving or shifting demand. Benefits – such as less congestion, lower emissions, and lower prices – flow to the entire system, including to those who have made no effort to conserve electricity.

Most consumers don't know the full benefits of demand side management nor do they know how to achieve it. In fact, no single market participant sees the entire electricity sector and hence has an interest in the benefits that might flow to the entire system from demand side management.

Further, conservation faces a range of longstanding market barriers. For example, enabling consumers to buy and install energy-efficient compact florescent light bulbs means not only educating consumers about the long-term savings that they can achieve, but also ensuring that retailers, wholesalers and manufacturers support the needed marketing and distribution. Bringing about such market transformation can entail a range of incentive and public awareness initiatives.

Another barrier to conservation is the way in which most consumers and institutions, often including governments, view capital and operating budgets. From a short-term financial perspective, it may appear to make sense to spend less on energy-inefficient capital goods, even though long-term operating costs may be higher. Similarly, developers of residential and commercial rental units may choose the least expensive (but most energy-inefficient products and technologies) since they do not bear the ultimate long-term costs.

Finally, the 4.3 cent/kWh fixed price for medium and low volume consumers has discouraged conservation, since the price turned out to be considerably below the cost of production. While some energy conservation will naturally follow as prices rise, the Task Force believes that the ending of the price freeze offers a unique opportunity to introduce reforms which foster investment in conservation.

The Task Force believes that action by the Government needs to be taken on a wide front to encourage demand side management and to build a culture of conservation in Ontario.

Case Study:

Electric City has developed technology that allows it to remotely control lighting. It has contracted with over 100 industrial, commercial and public sector institutions in the Chicago area to reduce lighting by pre-agreed amounts when demand and prices are high. It sells this load reduction to Commonwealth Edison at peak times, reducing the need for standby generation.

4.4 Demand Response

Demand response reduces the need for incremental supply, and helps lower electricity costs by reducing price volatility.

Demand response can lower system load when the supply-demand balance is tight, and help moderate energy prices. Recent U.S. studies have estimated that a 2-5% reduction in demand on days when peaking generation would otherwise be needed can reduce prices by as much as 50%.

To date, Ontario electricity consumers have shown only limited responsiveness to price signals. Residential, institutional and small commercial customers under a fixed price have had no economic incentive to alter their consumption. Wholesale consumers have been limited by barriers, such as imperfect market information and scheduling constraints created by their own operations or the IMO's procedures.

We also note that the only part of electricity service for which there are any price signals is the electrical commodity—about half of the electricity bill for most consumers. Charges for transmission and distribution are usually flat, even though wires are stressed at peak times.

Ontario currently has two mechanisms that enable wholesale consumers to respond to price signals. The IMO's dispatchable load program allows consumers to partially or completely reduce consumption when prices reach a certain level. The other current program is the Hour Ahead Dispatchable Load program. It addresses barriers faced by wholesale consumers in predicting their electricity consumption and responding to instructions from the IMO.

Other mechanisms being reviewed include a day ahead market

The IMO is considering, but has not yet implemented, other mechanisms to enable price responsiveness. Under study are a day ahead market that would enhance price predictability and provide a mechanism for increased demand response, and an economic demand response pilot program that would provide financial incentives to consumers to overcome institutional, technological and knowledge-related barriers that they may face in responding to price signals.

The Task Force supports these initiatives by the IMO. We note that, in the near term, it may be easiest to implement demand response in the wholesale market and that IMO can play a lead role.

We agree that there should be programs that allow verifiable dispatchable load to be treated equitably with generation and to be compensated in a similar way. Demand response can produce the same and even additional benefits to the system. Demand side bidders should not be compensated for demand reductions that they would ordinarily make in response to high electricity prices, or be compensated for conservation that is economically harmful (such as closing a plant rather than scheduling production). This said, we support the thrust of the IMO's economic demand response pilot, and add that it may be appropriate, in some cases, to recognize social costs and benefits (e.g. emissions) when comparing a demand reduction bid with a generation bid of equal size and cost.

We heard about programs operating successfully in other jurisdictions and received many suggestions for similar programs in Ontario. For example, Ontario could develop a demand response program similar to the New York Independent System Operator's "Day Ahead Demand Response Program", or a program similar to the price-taker programs in New England and the Pennsylvania-New Jersey-Maryland system, under which the system operator offers the price at which participants are paid to reduce demand.

The Task Force believes that over the longer term demand response should be aggressively pursued in the retail market as well as the wholesale market, through such measures as economic DR programs, time-of-use rates, smart meters and load control devices. Demand response at the retail level may take longer to achieve because of the number of consumers, the need to aggregate to achieve meaningful reductions in demand, and the need to retrofit old meters or install new metering technology.

Case Study:

Starting in December 2003, five Local Distribution Companies (Hamilton, Mississauga, Newmarket, Oshawa, and Veridian) joined Olameter in a load control pilot program to demonstrate the feasibility of using Internet-based gateways in the home or office to control heating, ventilation, air conditioning and other loads. It allows each customer to monitor his or her hourly energy usage via the Web and gain access to a wealth of pricing data and energy conservation information. In addition to technical feasibility, the objective of this program, is to demonstrate that overall capital and operating costs of such a system are no greater than the capital costs, alone, of equivalent peaking capacity.

4.5 Enabling Consumers to Better Respond to Prices

Electricity prices do not at present send appropriate signals to Ontario consumers. In fact, very little of the Province's electricity demand currently responds to price.

At present, the commodity price for electricity for residential, small business and other designated customers is fixed at 4.3 cents/kWh. The Task Force believes that this price has discouraged conservation by understating the true cost of electricity. A new interim retail price plan for residential, small business and other designated customers will go into effect on April 1, 2004. Under this plan the price for electricity will increase on April 1, 2004 to 4.7 cents/kWh for the first 750 kWh of electricity consumed each month and 5.5 cents/KWh for monthly consumption beyond 750 KWh. The Government has indicated that this pricing plan will stay in place until the Ontario Energy Board develops new mechanisms for setting prices in the future. The Board's new pricing structure must be put in place no later than May 1, 2005.

Even under the revised cap, small customers are not encouraged to shift the timing of their consumption.

The Task Force agrees that the new interim pricing structure better reflects the average wholesale market price for electricity and provides an incentive for these customers to moderate their total electricity consumption. The new pricing structure does not provide an incentive, however, for these customers to better manage how they use electricity by shifting discretionary electricity consumption from periods of peak demand.

Large electricity users in Ontario are already subject to real time electricity prices. All electricity customers with an average peak monthly demand of over 1 MW and all new customers with an average peak monthly demand of over 500 KW must install interval meters. As a result, a number of large users have taken steps to manage their electricity use more efficiently by shifting demand from high priced peak periods to non-peak periods with lower prices.

Case Study:

Noranda's mining operators can read real-time electricity prices on their control screens and modify production accordingly. Energy intensive operations like lifting ore to the surface can be scheduled to take advantage of lower power costs.

The Task Force believes that a price structure that encourages mid- and small customers to manage consumption is necessary in Ontario. This price structure does not need to be complicated, and there are a number of time of use pricing systems in other jurisdictions that Ontario can use as a model. The simplest version of a time of use rate would be a 2 tier (peak/off-peak) price structure.

The use of smart meters should be encouraged.

Smart meters (which note the time of consumption) are the primary enabling tool for customers to respond to time of use price. Moving to smart meters will require significant investment from local distribution companies in Ontario. Mechanisms will need to be put in place to encourage these investments. In addition, action by the Government, local distribution companies and the private sector will be required to inform electricity consumers of the benefits of managing their usage patterns.

4.6 The Role of Local Distribution Companies

The Ontario Energy Board has been directed by the Minister of Energy to identify and review options for the delivery of conservation activities in the electricity sector, and to include in this review the role that local distribution companies could play in providing these activities. The Board established an advisory group with expertise in conservation, and will deliver a report in early spring 2004.

LDCs will be key to delivering conservation, but need to be rewarded (or at least not punished) for doing so.

In the current market, Ontario's local distribution companies have little incentive to promote conservation and face financial barriers to doing so. LDCs face the risk of delivering conservation programs and losing revenue because of lower volume throughput. In the natural gas industry, where conservation is delivered by Ontario's gas distributors, financial incentives – for example, funding to deliver programs, compensation for lost volume revenues, variance accounts to manage under- or over-spending, and sharing in the cost savings – are provided and recovered through rates. Similar mechanisms are used to encourage conservation by electric utilities in the United States.

The current regulatory structure which requires that LDCs and transmitters act as "wires companies" whose core business is to distribute electricity, earning revenues on the amount of electricity flowing through their system, does not allow for the provision of conservation programs. This is instead included with retailing electricity and other services assigned to their retail affiliate companies or the private sector.

The Government should reduce barriers that keep LDCs from aggressively promoting conservation.

The Task Force believes that action should be taken to help LDCs overcome these barriers. Local distribution companies are favourably positioned to provide conservation programs. They are close to their customers, understand their local market conditions and may be able to better target certain programs. Goodwill exists and utilities are generally considered to enjoy strong customer trust, loyalty and brand recognition. LDCs have existing marketing relationships with delivery partners, for example, with builders or HVAC (heating, ventilation and air conditioning) contractors. In the case of some of the larger commercial and industrial customers, LDCs may provide important technical expertise.

We think that local distribution companies have a central facilitating role to play, and that they can act as a conduit for the delivery of conservation activities in partnership with private firms and the voluntary sector.

4.7 The Role of the Private Sector

Although local distribution companies have a central role to play in conservation, private firms will often be better-positioned and have the necessary expertise to provide front-line delivery (for example: meter retrofits or insulation programs). In addition, Ontario's 94 LDCs differ in their capability to deliver conservation. Smaller LDCs in particular may prefer to contract out the provision of much of their conservation activities to other LDCs, private firms or the non-profit sector.

Some private sector firms also have conservation expertise.

In some instances, a delivery structure involving several organizations may be the best route. Local distribution companies, which in most cases have the strong relationship with consumers, could act as facilitators to develop leads and sub-contract detailed implementation to the private sector. The Task Force looks forward to the development of innovative business relationships and a sustainable competitive demand management industry that would lead to greater innovation, continuous improvement and more cost-effective delivery of conservation in Ontario.

4.8 The Role of the Voluntary Sector

The voluntary and non-profit sectors in recent years have performed an important role in promoting conservation in Ontario. Community groups are not only promoting the development of a conservation ethic, they are a delivery point for conservation programs within local communities.

Over the past decade organizations such as Greensavers in Toronto, through the federal government's Energuide for Houses program, have been conducting home energy audits and educating home owners on measures they can take to reduce their energy bills.

In addition, associations such as the Ontario Federation of Agriculture can take lead roles in conservation efforts.

Voluntary effort should also be recognized.

Case Study:

Greenest City, a non-profit, community based environmental organization, provides energy efficiency advice and audits to small businesses in Toronto. For further information: *www.greenestcity.org*

The Task Force believes that these organizations provide an example of how conservation programs can be delivered to Ontario homes, farms and businesses in a cost effective manner.

4.9 Setting Standards: The Role of Government in Delivering Conservation

A key government role is in setting energy efficiency standards...

One of the primary conservation roles of all levels of government is to support the development of energy efficiency. Particular activities that governments can undertake include:

- establishing efficiency standards for energy using products (including minimum and high efficiency levels);
- establishing efficiency standards for buildings;
- providing incentives through the tax system for individuals and corporations to purchase energy efficient products;
- informing the public of the benefits of conservation.

In Ontario there are regulated minimum efficiency levels for over 50 energy using and related products. National efficiency levels are set by the Canadian Standards Association and referenced in regulation under provincial legislation.

There is a cost involved in developing national efficiency standards and there is a need for long-term funding assurances to ensure existing standards are adequately supported and to allow for the development of new high efficiency levels.

... for appliances and other products...

The Task Force believes that governments should continue to promote the development of minimum efficiency and high efficiency levels for energy using products. Governments should continue to reference minimum efficiency levels in regulation.

Governments should encourage the purchase of high efficiency products through tax incentives.

While it would be preferable to develop national energy efficiency requirements for buildings, this has proven in the past to be a difficult task. Ontario should reaffirm its leadership in this area.

In most jurisdictions, government regulations concerning building construction deal with issues of health and safety, but do not address energy efficiency. Suggestions to address energy efficiency requirements in the National Building Code have been resisted because of concerns over cost implications. Often these concerns do not consider or value energy cost reductions.

...as well as buildings.

Ontario is one of the few jurisdictions in Canada to incorporate minimum energy efficiency requirements into its building code. These requirements, however, have not been reviewed in the last decade.

4.10 The Need for a Conservation Champion

If conservation is to achieve its full potential in Ontario, a conservation culture needs to be promoted.

Since no single market participant sees the entire system (and hence the benefits to the electricity system and to society at large that can flow from conservation), the Task Force believes that there is a need for a lead organization to champion conservation in Ontario.

Many groups and individuals are needed to build a conservation culture.

The Task Force sees a role for all players in conservation. We see the following roles and responsibilities for public agencies:

- The IMO, which operates the wholesale market, would oversee and promote demand response in the energy and capacity markets
- The OEB would set rules for consumer, utility, and retailer interface (meters, load controllers, settlements); regulate and approve rate applications; establish guidelines for incorporating conservation and demand side management into rates; and audit programs to ensure that participants were not being paid more than once for the same initiative.

The Government would oversee enabling legislation for the IMO and OEB, regulate equipment and appliance efficiency, support codes and standards development, provide tax incentives for energy efficient equipment, and help fund education and consumer awareness programs.

The Task Force believes that there remains a need for a lead organization to champion conservation and with a mandate to oversee the various conservation activities and to assess the relative benefits of each.

But a champion should lead the way.

A conservation champion could coordinate conservation activities by monitoring and reporting activities across the market and government. It would have the following characteristics:

- It would ensure that the costs and benefits of conservation and demand side management measures are considered along with new generation and transmission in meeting the long-term objectives of security of supply, adequacy, affordability, reliability and environmental soundness in Ontario's electricity system.
- It would coordinate conservation as part of Ontario's electricity market
- It would help ensure cost-effectiveness of conservation and demand side management activities
- It would ensure consistency and complementarity with overall electricity policy.

An expanded OEB could fulfill this role, or another agency could be given the mandate.

Case Study:

British Columbia is considering a "Foundation for Conservation, Efficiency and Alternative Energy". The foundation would be a public-private partnership and include experts from industry, universities, Government and public-policy organizations. It would take an overall leadership position in these areas, advising the provincial Government, and developing greater public awareness.

Related Recommendations

1. Ontario needs to create a conservation culture that delivers cumulative and sustainable improvements in energy use and demand response. Ontario's long-term plan for electricity should include a comprehensive conservation strategy, with clear targets, reflecting a full analysis of the costs and benefits of conservation.
2. The IMO should introduce market rule changes and systems to facilitate increased demand response at the wholesale level.
3. The IMO market rules should enable demand response capacity to bid into, and be recompensed by, any capacity market developed in Ontario, on the same basis as supply capacity.
4. Consumers should be encouraged to shift consumption from periods of high demand and high prices. In order to achieve this, they will need both the incentives in terms of differentiated prices and the technology in the form of smart meters.
5. Retailers, energy service companies and local distribution companies should be given benefit sharing opportunities to encourage them to invest in and market new technologies and services in order to help consumers reduce consumption and shift their power use from periods of high demand and high prices.
6. Local distribution companies and transmitters should be compensated under appropriate regulatory oversight whenever they invest directly in demand side management, or work with private sector companies to facilitate it. They should also be compensated for revenue loss resulting from conservation. This is currently done in the natural gas industry.
7. Local distribution companies should evaluate conservation on an equal basis with new supply options and distribution investments.
8. The private sector has a key role to play in developing and marketing conservation solutions and should be encouraged to provide conservation services at both the retail and wholesale level. The private sector should be recognized by the OEB as an alternative to LDC delivery of conservation measures.

9. The voluntary sector and other non-governmental organizations should have a role in delivering conservation solutions directly to Ontario homes, farms and businesses.
10. Governments should contribute to enhanced conservation in a variety of ways, including through tax incentives, the development of energy efficiency standards and reducing their own electricity use.
11. Education is key to ensuring effective implementation of energy conservation programs. A consistent message needs to be given across Ontario, encouraging conservation and providing all stakeholders with an understanding of available programs and how to use them.
12. A conservation champion should be created to monitor and coordinate conservation activities and serve as the focal point for a conservation culture in Ontario.
13. The Task Force endorses the process currently under way at the Ontario Energy Board which is expected to provide more detailed advice to the Government this spring on the appropriate organization and funding of conservation in Ontario.

5. Ensuring Adequate Supply

5.1 Introduction

This chapter addresses the supply options available to Ontario and the implications of various approaches.

It is not the intent of the Task Force to recommend a specific mix of supply and conservation choices. Rather, we suggest ways to address impediments to achieving an adequate, affordable and diverse supply and demand mix.

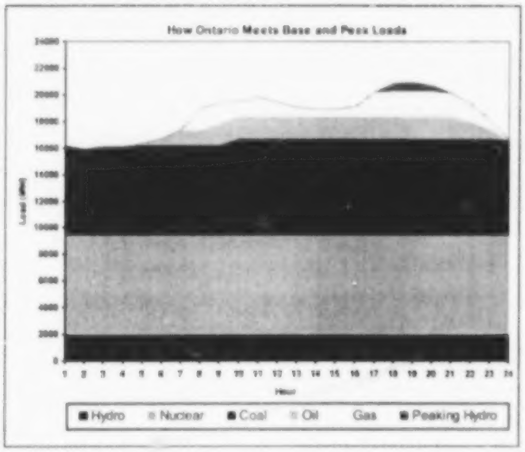
5.2 Roles of Baseload and Peaking Plant

Our electricity supply comes from a combination of plants providing continuous (baseload) output, plants which provide power regularly but not continuously, and those that only run during peak periods.

Any discussion of long-term resource adequacy for the Province must consider different forms of supply, namely: baseload generation, intermediate load generation, peaking generation, intermittent generation and imports.

Baseload resources are those that are best suited to operate continuously at, or near, full output. They are the foundation of any electricity system. In Ontario today, baseload comes primarily from nuclear generation, natural gas-fired cogeneration and waterpower where there is no storage capability. In general these tend to involve large, capital-intensive projects with relatively long construction lead times.

FIGURE 5.A



Intermediate load generators are best suited to operate for about 8-16 hours each day. Market factors typically result in such plants being on-line during peak hours, and shut down during off-peak hours. Examples include coal- and oil-fired generation, waterpower and, combined-cycle gas-turbine generators.

Peaking generation is best suited to operate for short periods of time. Such operations are very sensitive to market price, and usually set the market clearing price during peak demand hours. These generators are a valuable source of operating reserve (because of their inherent flexibility). Examples include storable waterpower, simple cycle gas turbine generators and combined-cycle turbine units. Since they need to be commercially viable while operating infrequently, peaking plant tends to have low capital costs and relatively high variable costs (mostly fuel).

Intermittent Generation is provided by generators that produce energy only when conditions are suitable for operation. While technology now exists to much better forecast wind power generation, for example, conditions for intermittent generators are not accurately predicted far in advance so longer term scheduling is not possible. Intermittent generators can be valuable as a source of energy for load displacement, but their inherent unpredictability does not allow them to be used for baseload or peaking purposes.

Imports round out the picture.

The final source of supply is electricity imported from outside the Province. Imports are a valuable source of energy and capacity in the Ontario market. Over the past two years, they have played a major role in ensuring adequate supplies for Ontario consumers. Some neighbouring US systems are predicting healthy reserve margins over the next 10 years. Ontario is also well situated between two of North America's largest exporters of waterpower. Manitoba with its large suppliers of power, but limited storage capacity represents a major potential source of intermediate power. Quebec, with major reservoirs to act as storage, is better able to meet peaking needs.

The level and stability of future power prices depend primarily on the chosen power supply mix.

FIGURE 5.B
POTENTIAL SOURCES OF NEW SUPPLY

Characteristics of Supply Sources					
Fuel	**Prime Use**	**Fuel Cost**	**Capital Cost**	**Environ-mental Impacts**	**Risks/ Impediments**
Natural gas-Combined Cycle	Peaking or Intermediate	High	Low	Low emission rates	Supply and price volatility
Natural gas-Simple Cycle	Peaking	High	Low	Low emission rates	Supply and price volatility
Natural gas-Cogeneration	Baseload	Medium	Low	Low emission rates	Supply and price volatility, steam host business risk
Nuclear	Baseload	Low	High	No emissions	Delays and cost overruns
Coal	Baseload / Intermediate	Low	Medium (High for Clean Coal)	High CO_2, NO_x and SO_2 emissions	Environmental regulation (incl. carbon limits)
Water	Baseload, intermediate and peaking	Low	High	No emissions	Rainfall dependency, siting and permitting
Wind	Intermittent	None	High	No emissions	Siting and permitting

5.3 Renewable Energy

To diversify the mix and minimize the impact on the environment, the potential of renewable sources must be developed.

Increased investment in renewable energy represents one attractive approach to help meet Ontario's power needs. Ontario's renewable energy potential is substantial. The Province has committed to increasing the share of renewables in the Ontario power mix by 5 percentage points (1,350 MW) by 2007 and by 10 percentage points (2,700 MW) by 2010. Several renewable energy projects are currently in advanced stages of planning and could respond quickly to any call for proposals.

Renewables take several forms...

These new energy sources are generally more expensive than other power sources and are unlikely to be developed without at least temporary price support.

Waterpower...

Currently, waterpower accounts for the largest proportion of the just over 8,000 MW of renewable capacity in the Province.

The Ontario Waterpower Association estimates that 1,200 to 4,000 MW of additional water power potential exists in the Province. The amount that is actually developed will depend heavily on siting and permitting processes as well as prices.

The expansion of existing reservoirs and new multi-year reservoirs could substantially increase the value of Ontario's waterpower resources by increasing their ability to meet the Province's needs for peaking capacity. Reservoirs and pumped storage are also valuable complements to wind power, creating the ability to "store" wind energy, and smooth out the generating capacity of wind installations.

Wind...

The Wind Power Task Force estimates potential capacity of 2,100 to 6,200 MW. Wind power in Ontario has a capacity factor of 30-35%.

The advantages of using wind power include: speed of installation (6 months to a year after permitting is complete), no fuel cost, stable generation cost, and a strong correlation to electricity requirements (installations produce more power in winter and during the day). The cost of wind energy has come down as larger units have been developed. In a study carried out for the Task Force, Navigant Consulting estimated the price gap between wind power and other alternatives for new generation to now be relatively small. Large scale wind farms have been integrated into several European and North American grids and form a rapidly growing part of the electricity supply in many of those markets.

Biomass...

Biomass energy is generated primarily from burning waste products such as landfill gas, wood chips from forestry operations and animal waste. New biomass energy could provide an additional 1,700 MW of power.

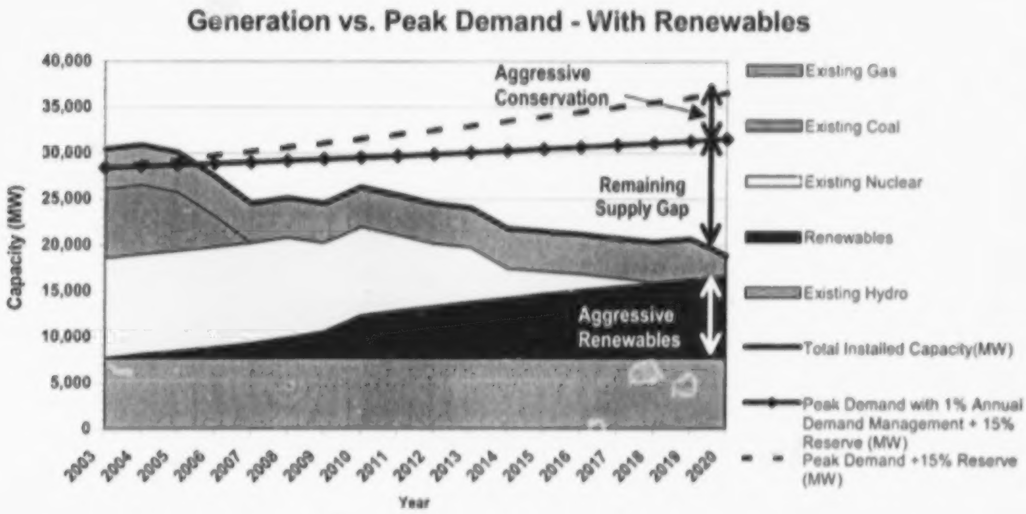
and others.

Other renewable energy sources include solar power, and geothermal energy (energy derived from heat in the earth). While many of these renewable energy options are now relatively mature technologically, they remain expensive and have not been widely used in North America. The major reason is the wide range in both capital costs and performance. In the case of solar power for residential units, the total installed cost can be anywhere from $7,000 to $12,500 per KW with only 14-20% of capacity actually usable.

The latest US Energy Information Administration projection, to be released in January 2004, predicts annual growth of 1.9% in electricity generated from renewable sources over the period to 2025. This pace of growth, which is considerably slower than the pace of growth projected for Ontario, reflects high capital costs, the ready availability of cheaper fossil alternatives, particularly coal, and the lack of remaining hydro capacity to be developed in the US. Renewables are projected to account for about 10% of US electricity generation in 2025. The comparable figure for Ontario is about 30%.

When aggressive investment in renewables such as wind and new hydro sources are combined with aggressive conservation, this shortfall drops to approximately 12,700 MW.

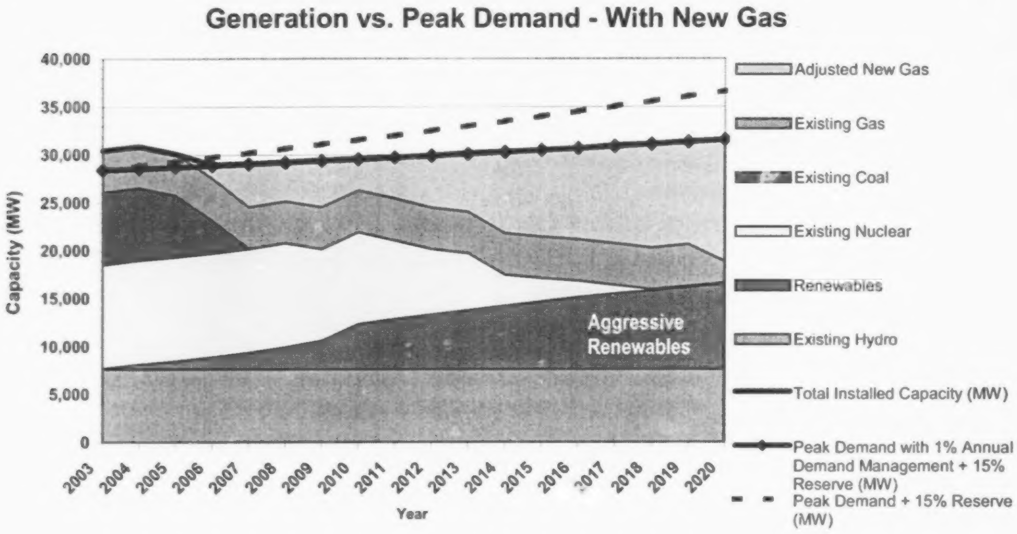
FIGURE 5.C



5.4 Natural Gas-Fired Generation

The remaining gap could be addressed in a variety of ways. Most of the new generating capacity developed over the past 5 years in Ontario has been fired by natural gas. Natural gas as a fuel for electricity generation has a number of attractive features, particularly in competitive markets. It requires relatively smaller capital outlays; it can be sited and built more quickly, often closer to consumers; and it is relatively clean.

FIGURE 5.D



Natural gas can be used to generate electricity in three different configurations:

Simple cycle gas turbines are best suited to peaking applications. Offering low initial capital costs, flexible sizing and construction, and reasonably clean operations, they can be used to enhance system reliability, and (in distributed applications) alleviate transmission congestion. However, they are relatively inefficient method of using gas, meaning the variable cost of energy produced will be expensive.

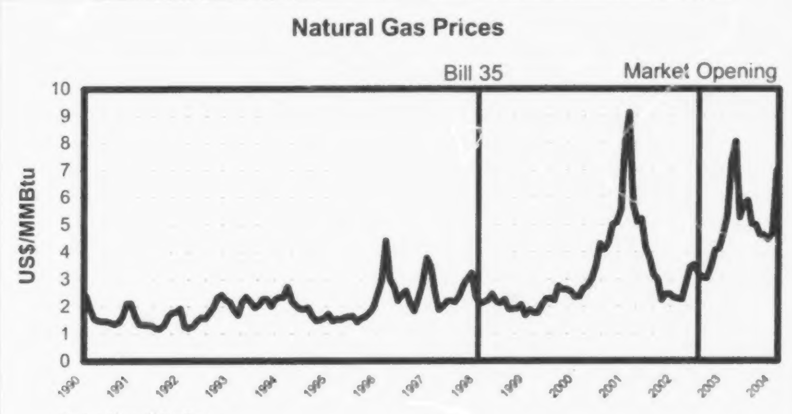
Combined cycle gas turbines produce electricity directly from the burning of gas and also by using the exhaust heat in a secondary generation process. They are suitable for intermediate or peaking load uses; during times of low gas prices, they can also provide baseload generation. This is a dependable, established technology, with lower operating costs than the single cycle approach.

Gas cogeneration involves the production of electricity in a combined process which also produces heat (generally as steam) for industrial or commercial use. This is also an established technology, primarily used for baseload generation. Very high efficiencies are possible, but applications are limited due to the need for a purchaser for the associated heat and steam. In addition to electricity supply, cogeneration can provide economic benefits to industrial, commercial or residential loads that are important in keeping Ontario's economy competitive.

Natural gas offers a variety of proven solutions... tied to a fairly volatile fuel cost.

Although gas fired generation has a major role to play in Ontario's future electricity market, recent price volatility suggests that overly heavy reliance on gas-fired generation carries risk for Ontario ratepayers.

FIGURE 5.E



Average Henry Hub prices

While there is some prospect that the gas price volatility experienced recently will decrease as liquefied natural gas (LNG) facilities are expanded and pipelines to frontier sources are developed, these developments are unlikely to be realized during the current decade.

5.5 Distributed Generation

Distributed generation is any generation that is located in relatively close proximity to electrical load. DG facilities can be connected to the transmission or distribution systems or can stand alone. Distributed generation often takes the form of inside-the-fence generation (on-site generation for use by an industrial operation or mine), with or without some sale to the distribution/ transmission grid but it may be entirely for sale to the market. Distributed generation can vary in size from less than a megawatt to in excess of hundreds of megawatts.

Distributed generation should be part of the solution.

By supplying power near load, it is possible to avoid or defer transmission and distribution investments that would otherwise be needed to supply electricity to the load. Reductions in transmission and distribution line losses may also occur due to reduced transmission and distribution distances At times of system stress DG can enhance system reliability.

Distributed generation projects are generally smaller, and require less capital than larger, centralized plants. Being easier to finance means more generation developers could undertake such projects, leading to the inherent benefits of competition.

Distributed generation projects can generally be permitted and constructed faster than larger installations.

Natural gas and some renewables are well suited to serve as distributed generation capacity. Distributed generation also allows more scope for use of innovative fuels.

Case Study:

For the past five months, Olameter has operated a distributed generation pilot project in conjunction with Toromont industries. The project involved 13 generating units representing 30 MW at 8 separate sites. The generators were synchronized to the grid and are operated by remote control, either on an automated basis (using a preprogrammed set of business rules including spot price signals), or as part of a centrally-controlled fleet of dispatch-ready generation. The technology allows existing generators, even those as small as 250kW, to be used to deal with periods of high electricity prices, with grid congestion or with civil emergencies. In addition to technical feasibility, the objective of the pilot was to demonstrate that overall capital and operating costs of such a system are significantly less than the capital costs, alone, of equivalent peaking capacity.

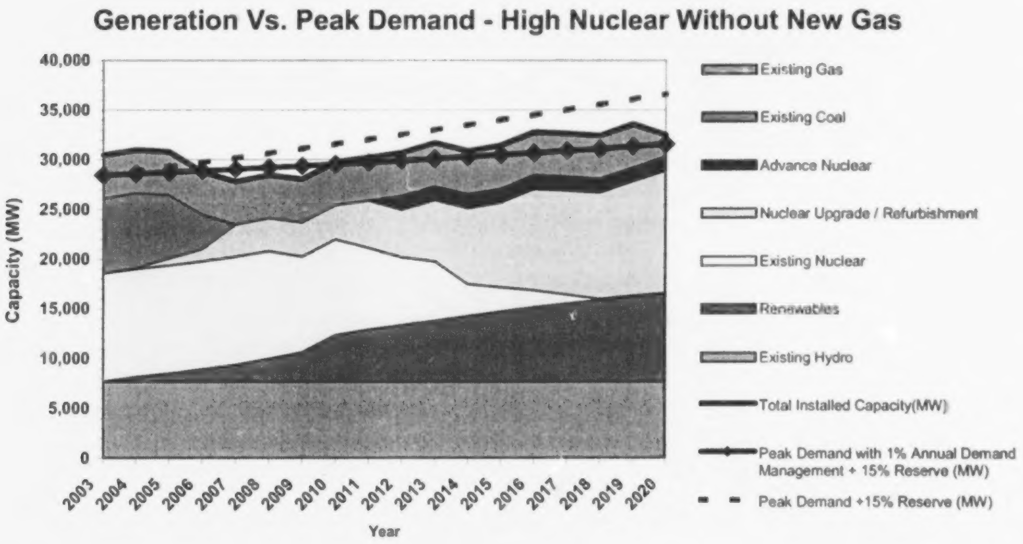
The US Department of Energy expects 20% of new generation to come from distributed generation by 2010. Distributed generation capacity is included in the natural gas and renewables components of Figure 5.D above and therefore is not shown separately.

Those distributed generation projects that rely on natural gas as their principal fuel will share the same concerns about the price and availability of natural gas as other forms of gas-fired generation discussed above. In all likelihood, most customers who rely on these gas-fired generation facilities will wish to be connected to the grid for both reliability reasons and so that they can substitute cheaper power when gas prices rise.

5.6 Nuclear Power

An alternate approach would see the bulk of the remaining gap filled with nuclear power. The case shown below combines aggressive conservation measures, renewables and nuclear generation. This would require both refurbishment of some existing nuclear plants and construction of new nuclear units.

FIGURE 5.F



Generation Vs. Peak Demand - High Nuclear Without New Gas

Despite some problems in Ontario...

Nuclear energy represents the largest single share of Ontario's generation fuel mix. It provides reliable clean power at relatively low marginal costs. However, the nuclear sector in Ontario has experienced a history of cost overruns and underperformance, culminating in the recent problems at Pickering.

...nuclear generation has performed well on a world wide basis.

Worldwide nuclear performance, on the other hand, has increased steadily since the late 1980s. Capacity factors in the US increased from 70% in 1989 to about 90% in 2001. If Ontario nuclear operators could achieve a 90% capacity factor on an ongoing basis, that alone would succeed in delivering the equivalent of approximately 1,500 MW of additional generation capacity.

Ontario's nuclear fleet's performance has been mixed. The recent Pickering A Review attributed the cost overruns and delays in returning the Pickering A units to service primarily to poor initial estimates, poor planning and poor management. At the same time, Bruce Power has succeeded in bringing two units at Bruce A back into service at reasonable costs and within reasonable timeframes. The Darlington nuclear plant is of a later vintage and has run reasonably well.

Analysis prepared for the Task Force by Navigant Consulting suggests that new Advanced CANDU Reactor capacity can be cost competitive with combined cycle gas-fired generation at gas prices above US$4.00 per MMBtu. The latest forecast from the U.S. Department of Energy suggests that gas prices will remain, on average, above that level.

Options are already being weighed..

If nuclear power is to continue to play a major role in Ontario, nuclear plant operators in Ontario will need to assess the risks and costs of plant refurbishment against new construction. We expect that the recently announced OPG Review Committee will ensure OPG carries out this assessment and we expect the management of Bruce Power to undertake similar analysis.

In any decision to maintain nuclear power's role in Ontario, construction and operating risk to the taxpayers of Ontario must be minimized. We understand that nuclear developers and nuclear operators are prepared to bear these risks.

As with other generation options, a contract that provides developers with predictable prices would likely be required, before refurbishment and new construction can begin.

... but decisions are needed so that other parties can start to plan.

OPG has indicated that its laid-up reactors at Pickering A could be returned to service by 2007 and could help fill the supply gap created by the planned closure of Ontario's coal plants. The two remaining laid up units at Bruce A could potentially be returned to service in that time frame as well. The uncertainty around these decisions needs to be resolved as quickly as possible.

Ontario's oldest nuclear units have been in operation for about 30 years and its youngest for 10 years. The Task Force heard that the planned operating life of each nuclear station is dictated by a number of key components such boilers and reactor pressure tubes. These components will either need to be replaced at the end of their lives and the stations refurbished, or alternatively, the plants will have to be shut down at that time. The first of the nuclear units currently in service is likely to require refurbishment by 2009 and other nuclear units follow progressively thereafter over a period of approximately 10 years.

The Task Force was advised the nuclear refurbishment projects are technically feasible but would require significant capital investment. A viable business case for this investment by the private sector would require long term contracts for the sale of future output. As such, the extension of the lives of the existing nuclear fleet will present an investment challenge very similar to that facing new generation projects. Without the nuclear refurbishment programme the requirement for building new generating capacity in the Province beyond 2009 becomes significantly larger.

New nuclear plants would take until at least 2011 to come into service assuming an immediate go ahead and a 2-year environmental assessment process. If Ontario were to move back to a high degree of reliance on nuclear power through life extension and new build, proponents would want to ensure that they had attractive markets for their baseload power produced in periods of low demand. One option that could be attractive is the "banking" of power with Quebec or Manitoba, allowing those markets to store water and generate more power when it has higher value. Another longer-term option that may become more attractive is the use of off-peak power to produce hydrogen for use in fuel cells for automotive and other purposes.

5.7 The Role of Imported Power

Imported power has played a major role in meeting Ontario's need for intermediate and peaking power over the past five years. Ontario, situated between two major waterpower exporting provinces, can take advantage of these sources of clean power.

Ontario has opportunities to increase interconnection with Quebec...

A study presented to the Ontario Energy Board in support of the proposed interconnection with Quebec demonstrated that two-way trade in power between Ontario and Quebec could provide annual benefits of approximately $250 million to Ontario ratepayers in a fully competitive market. This link could be completed in three years and would help meet the pressure Ontario will face as it phases out its coal plants. In the longer term, as Quebec and Newfoundland and Labrador proceed to develop more waterpower resources, east-west electricity trade could be expanded further.

... as well as Manitoba.

Manitoba has up to 5,000 MW of waterpower capacity to develop. While drought has undermined Manitoba's export capability this year, Manitoba Hydro expects to be able to export power to Ontario starting as early as 2005 and could expand these exports as transmission capacity becomes available. While the transmission costs of moving power from northern Manitoba to southern Ontario are large, the delivered cost may be competitive with other power available during peak periods, particularly if the associated emissions reductions can be recognized financially. There are, of course, major aboriginal and environmental issues to address in developing projects of this sort.

Connection to neighbouring states adds reliability.

Trade between Ontario and the United States allows the sharing of reserves and provides additional protection to the Ontario system.

5.8 Coal-Fired Generation

The Ontario government has determined that the health and environmental impacts of the province's coal-fired generation plants are unacceptable and it has committed to closing those plants by 2007 provided adequate alternatives are in place. That choice creates a need for early and decisive action to ensure that Ontario homes and businesses continue to have adequate and affordable power supplies.

5.9 Implications of Alternate Supply Mixes

If Ontario is to eliminate coal fired generation as planned and maintain stable and competitive electricity prices, it will need to ensure both a diverse fuel mix and a market where the bulk of electricity trade is based on stable longer term contracts rather than spot prices determined by the cost of the marginal fuel. To achieve this, the Government will need to move quickly to promote the needed new supply and conservation measures.

The Government's plan to leave the coal fired plant in place until adequate replacement capacity is developed is a prudent one.

While the measures proposed in the Task Force's action plan are designed to address both these immediate challenges and the longer term needs for reliable and affordable power, the required negotiation and contracting activities, approvals processes and construction times will inevitably encounter delays.

FIGURE 5.G

Price Setting Fuel in Ontario (since market opening)

Fuel Type	Price Setting Fuel (% of time)	Average Price (cents/KWh)
Coal	56%	3.38
Gas	8.3%	7.64
Oil	22%	8.00
Uranium	0.03%	N/A
Water	15%	7.67

Coal has kept the cost of power low.

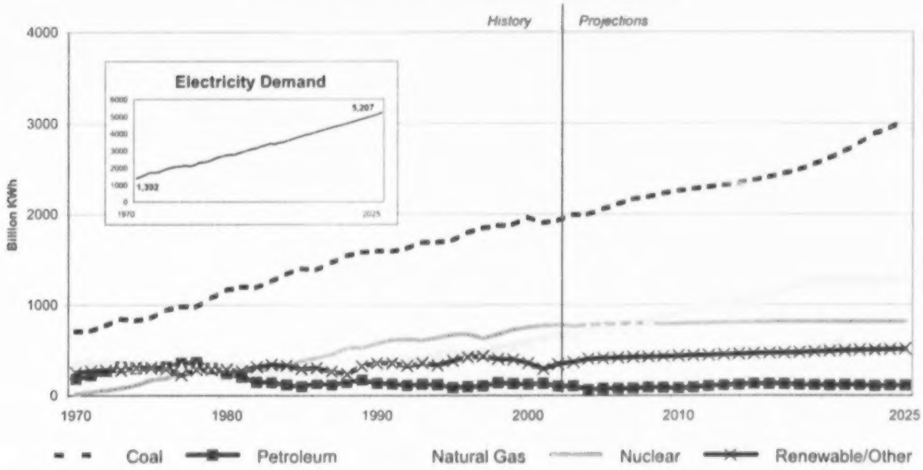
Since the Ontario market opened in May of 2002, coal–fired generation has been the effective price setting fuel over half the time. That is roughly in line with the pattern that exists in the state of New York and the Midwest. The average market price in Ontario when coal has been the last fuel dispatched has been about 3.4 cents, less than half the price of peak power from natural gas, oil and peaking hydro sources.

According to a US Department of Energy study to be released in January 2004, coal will remain the fuel of choice for electricity generation in the United States until at least 2025, accounting for

52% of US power production. The expected growth in natural gas-fired generation has been scaled back due to financing difficulties arising from the collapse of the energy trading, as well increasing uncertainty about gas supplies and prices.

FIGURE 5.H

Electricity Generation by Fuel in the US



Source: Energy Information Administration

In the absence of major new base load capacity additions, or changes to the price-setting process, the phasing out of coal would likely lead to prices being effectively determined by the marginal cost of peaking plant. This would mean a price that is both higher and more volatile than prices in competing markets.

Alternate supply scenarios...

The mix of fuels in Ontario will have a bearing on the level and variability of power prices in the province. It could also impact on reliability of supply. The approach to price determination will also play a major role in determining the level and volatility of Ontario power prices.

In the current market structure, energy is bid into the market, effectively based on the cost of fuel and operations, i.e. the unit's marginal cost. The last unit of energy selected essentially sets the clearing price for the market. As shown above, coal-fired plant has effectively determined the wholesale price of electricity in

Ontario on more than half the hours since the Ontario market opened.

Gas replacing coal...

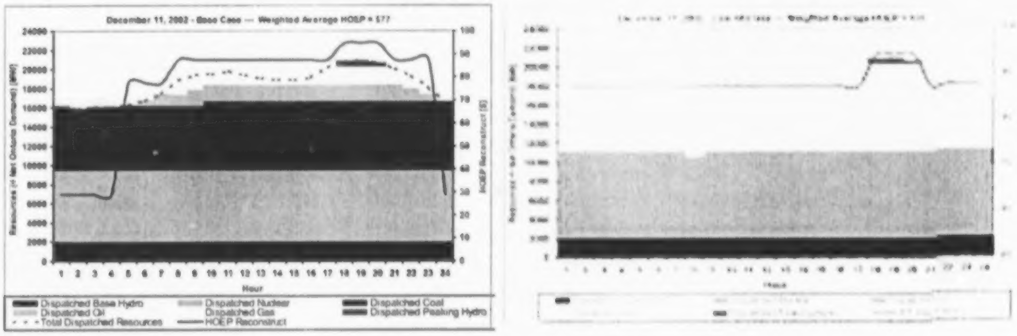
Were the existing coal plants in Ontario replaced primarily by natural-gas fired generation, and the current pricing regime retained, natural gas would become the price setting fuel most of the time. The two figures on the following page illustrate the modeled impact of this switch on electricity prices in Ontario for one day selected at random.

The figure on the left shows the electricity supply for Ontario on one typical day. Fuels are stacked according to their marginal cost and their normal order of dispatch, and the volume of power they produce can be read off the left hand scale. As discussed earlier, base hydro power and nuclear power have low fuel and operating costs and are not amenable to being turned on and off over the course of the day. Coal plants are next in the "merit order" given their relative operating and fuel costs, followed by oil and natural gas. Storable or peaking hydro power is a limited resource which economically should be saved for use when prices are highest.

The red line shows the resulting hourly average price over the course of the day. When the plants with lower operating and fuel costs are the last plants chosen, prices for all power sold in the spot market (read off the right hand scale) tend to be lower. When the higher price fuels are on the margin, prices for all output are higher. Base load producers recover their capital costs by receiving returns higher than their operating costs when higher priced fuels set the price. The average price for the day is a weighted average of the hourly prices. In this case, that price is a weighted average of the lower prices when coal is the price-setting fuel at night and higher prices when oil, gas and peaking hydro are on the margin. For the day chosen, that resulting price averaged $77/MWh or 7.7 cents per kWh.

The figure on the right illustrates the same situation with the fuel mix changed to replace all coal fired generation with gas-fired power. Since natural gas represents most of the operating and fuel cost for those plants and that price does not vary over the course of the day, the moderating impact of off-peak power prices is absent and the average price is $88/MWh or 8.8 cents per kWh.

FIGURE 5.I



The net effect, given gas prices as they existed in December 2002, is to eliminate the low price hours when coal set the price and, in the process, raise the average daily price of electricity (the average of the Hourly Ontario Electricity Price --- in this case, by about 15%. This increase could erode the competitive position of Ontario industry relative to that of competing markets where gas-fired generation continues to be the price-setter less of the time.

The potential economic impact of a major increase in dependence on natural gas fired generation is magnified by the ongoing volatility in gas prices and growing concern about the availability of affordable natural gas supplies over the next ten years. At current natural gas prices, the production cost of gas-fired electricity is about 1.5 cents per kWh higher than it was a year ago. In a market with gas on the margin the vast majority of the time and all generators paid on the basis of market clearing spot prices, this kind of volatility would be reflected in every kWh of power consumed in Ontario.

A mix of renewables, nuclear and gas...

An alternative supply mix would see Ontario's coal fired generation replaced by a mix of renewables (which have generally higher but more stable costs), nuclear power and natural gas fired generation, combined with aggressive conservation efforts. We examined a case similar to this and found that in a market where prices are determined primarily by spot-market prices, the impact on market clearing prices would be similar to the "mainly gas" option despite the greater presence of supply sources with less volatile fuel costs. This is the case because, despite the increased presence of sources with more stable costs, the increase in natural gas-fired generation is sufficient to ensure that gas fired generation would still be required much of the time and, as the last source dispatched, would effectively set the price most of the time. We therefore conclude that to achieve a reasonable degree of price stability and prices competitive with markets where coal is the dominant fuel, a new contracting approach to pricing is also required.

Nuclear replaces gas...

A third option would be to rely mainly on nuclear power to replace the coal-fired plant in a market based on the spot price. While that would potentially provide additional price stability, since nuclear fuel costs are relatively low and stable, it has its own problems. Excessive reliance on nuclear plant could expose the province to the kind of supply reductions that occurred with the lay-up of much of the nuclear fleet in 1997. Expanding the share of nuclear power to the point where this source is the marginal fuel is also not an efficient solution since varying nuclear production to meet variable needs over the course of the day is simply not technically feasible. In any event, additions of new nuclear plant to the nuclear fleet could not be in place early enough to accommodate the planned coal phase-out by 2007.

In consideration of these implications, the Task Force believes that a balanced approach with new gas-fired peaking and intermediate capacity, expansion of renewable power where economic, and new base-load nuclear and hydro capacity additions, combined with aggressive measures to conserve energy, are all likely to be part of a competitive energy supply for Ontario.

Price stability requires a diverse fuel mix and more contracted supply.

Long term contracts for new base load supply can provide both the revenue certainty project developers require to get financing and the price stability large and small consumers need as relatively low-priced coal fired generation is phased out. Contracts to provide the cost recovery certainty required to new peaking plant developers are also required. The contracting process and responsibility is addressed in the Task Force's recommendations.

5.10 Financing New Investment

Financing of new investments in supply and generation has been challenged by factors unique to Ontario...

A key area of interest for the Task Force was how to ensure that new investment in supply and conservation would be financed and undertaken efficiently.

The Task Force met a wide range of potential investors and representatives from the financing community: including banks, insurance companies, pension funds, rating agencies and investment dealers. They were unanimous in suggesting that a lack of clear and stable policies has been a significant contributing factor to the lack to new investment in supply in Ontario. They also cited a number of other impediments to investment specific to the Ontario market, including concern about the continuing dominant role of OPG in the market, concerns as to the independence of the OEB and the IMO and concerns over the planned return of nuclear plant.

... and by the continent-wide crash of power trading companies.

At the same time, they noted that the crisis in the North American merchant power business has undermined the ability to finance investment across North America. Even within a predictable policy and regulatory environment, investment in energy projects effectively requires long-term power purchase contracts with credit-worthy "counterparties": wholesalers, traders, retailers and final consumers. The collapse of the power trading business has eliminated many of the companies that could play this role or reduced their credit rating to the point where their contracts no longer represent acceptable bases for commercial finance.

We heard that there are two credible paths forward to address this need.

The Task Force does not support putting the solution to Ontario's power problems solely into the hands of the market.

Some argued persuasively that the current credit crisis is temporary and that, with a clear commitment to market solutions and measures to demonstrate commitment to those solutions, (such as a willingness to allow consumers to face whatever prices the market dictates and the sale of OPG's output to private traders and wholesalers), the market would in time provide the needed new investment. This approach has had some success in Alberta. We seriously debated this option and concluded that the risks associated with it were simply too great. This path provides no assurance that the needed supply will be in place to replace Ontario's coal fired generation in 2007 or to ensure an early start to the process of developing effective supply and demand options to rehabilitate or replace aging nuclear plant. It does not provide the stable and predictable prices Ontario consumers demand. It does not ensure that Ontario will have the diverse power mix we believe Ontario needs if its power prices are to remain competitive with neighbouring markets.

There was general agreement among both potential project developers and financiers that new investment requires contracts that provide a clear capability to recover costs and earn a competitive return on that investment.

Utilities with clear regulatory authority to recover contracted costs from their customers play this role in some markets. In the Ontario context, customers who do not choose competitive retailers essentially buy power from the spot market. This does not provide a reliable longer term market that could support contracts and new generation investment.

The "buy side" of the market needs to be organized.

In the Ontario context, new investment requires a purchasing party who can provide contractual certainty to investors and their financiers. We believe that, as a transitional measure and with the appropriate governance structures and safeguards to protect against potential conflict of interest, the IMO could play that role.

Over time, we expect the market to move toward a position where load serving entities take over the responsibility for selling power to customers who are not wholesale market participants and who do not choose to contract with competitive retailers. As the market matures, these LSEs could increasingly contract with generators and wholesalers for longer term power supply, potentially providing a basis for financing investment in new supply. We expect that there would ultimately be six to eight of these load serving entities to serve the province. Companies who could potentially fill this role include wholesalers, retailers, subsidiaries of Local Distribution Companies and others. As new load serving entities develop, the IMO should transfer energy contracting responsibility to them to as great a degree as possible, while still ensuring adequate power supply, in accord with the Province's desired supply and demand mix.

Historically, private sector generation was sold to Ontario Hydro under long term contracts, but more recently investment in generation has been made against the prospect of selling power in the competitive market. The behaviour of the competitive market could be affected by the measures proposed by the Task

Force to stimulate investment in new generation capacity, and by the introduction of heritage contracts for certain OPG assets. The Task Force agrees with the principle that private sector companies that were willing to make an early commitment to Ontario should not be penalized as a result of the changes we have proposed. Special measures may need to be developed to give effect to this principle, in cases where a clear disadvantage has been created.

5.11 Stable Policy and More Effective Institutions

The Task Force heard from a number of project developers and representatives of the investment community. They were unanimous in suggesting that a lack of clear and stable policy in the recent past was a significant barrier to the development of generation capacity in the province. Policy inconsistency increases financial risk for investors, and may cause them to delay their projects or go elsewhere. The Task Force wishes to underline the importance of this point.

Investors have also expressed concern about the approvals process. Environmental assessments and other processes are often onerous and expensive, and frequently take longer than investors are willing to wait. The Task Force recognizes that approval processes exist for good reason, and should not be suspended or compromised. However, we need to be certain that our procedures in Ontario do not become more onerous than those in competing jurisdictions. The Task Force recommends that a special task force be established to review the processes for generation and transmission approvals in Ontario to ensure that they remain in line with best practices in neighbouring jurisdictions.

Relatedly, the private sector has expressed concern about what it perceives as "policy silos" within the government. Certain ministries whose activities impact generation and transmission investments may not adequately appreciate the importance of these investments to the future economic health of the province. Decision making processes within government need to be adjusted to ensure that the province's electricity needs are duly considered. Ministries and agencies whose mandates impact the electricity sector include the Ministry of Environment, the Ministry of Natural Resources, the Ministry of Northern Development and

Mines, the Ministry of Municipal Affairs and Housing, the Ministry of Economic Development and Trade, and the Ministry of Finance.

There is also a need to clarify the respective roles of the various regulatory bodies and government owned entities in the electricity system. The OEB, the IMO and Hydro One are currently working to improve the transmission approval process. We comment on this further in Chapter 6. Of particular importance to private investors in generation is the role to be played by OPG. There is considerable uncertainty about the extent to which OPG will be used as an instrument of government policy and will be encouraged to make investments that the private sector might be willing and able to undertake. We comment on this issue in the last section of this chapter.

Ontario's electricity industry is entering a critical phase where massive supply additions and ambitious conservation efforts will be required. At the same time, the industry is facing a demographic challenge as many of the skilled men and women who run the system approach retirement. We believe that the electricity industry will be a challenging and exciting place to work. If we are to succeed in addressing the challenges we face, we need to attract and train the next generation of power workers.

Ontario also needs to be a leader in innovation. Other jurisdictions, most notably the United States, are making large investments in developing innovative approaches to conservation and the production of cleaner, reliable power, including nuclear power and clean coal. We need to do likewise.

5.12 Addressing the Future Role of OPG

OPG's role critical to Ontario market

The Task Force heard frequently that the position of OPG in the Ontario market represents a serious barrier to investment and effective competition, because of both its dominant market position and its government ownership.

The Government has created the OPG Review Committee, chaired by the Honourable John Manley, to report to the Minister of Energy by March 15, 2004 on the role of OPG in the Ontario electricity market, the appropriate future structure of OPG, its corporate governance and senior management structure, and the potential refurbishing of Pickering A Units 1, 2 and 3.

The Task Force supports...

The Task Force identified several areas where it feels the Government could effectively address the role of OPG in the evolving Ontario market, recognizing that the OPG Review Committee will also provide advice on some, or all, of these issues.

... the primacy of private investment in the contracting process,...

The process the Task Force is proposing to ensure adequate supply and reserve margins will involve potential investors bringing forward a wide range of supply and conservation initiatives under a fair, open and transparent process. There is a widespread perception that OPG, as a government-owned entity, would enjoy an unfair advantage were it to compete with private suppliers in such a process. The Task Force therefore believes that OPG should be limited to an investor of last resort role for projects the private sector is capable of undertaking.

...OPG partnering with private capital...

OPG currently owns a substantial majority of the generating sites and assets in the Province. These sites and assets can make a major contribution to meeting the supply needs of the Province. In many cases, private capital can share the financing, development and risk associated with these opportunities. Where practical and economic, OPG should partner with private capital to further develop its existing assets.

... and replacing the Market Power Mitigation Agreement.

The current Market Power Mitigation Agreement cannot be effectively implemented, given the Government's commitment to ongoing public ownership. The Task Force believes that it is necessary to develop a simpler approach to address concerns over market power and to moderate consumer prices.

Long-term regulated contracts reflecting the costs of power generated from OPG's hydraulic generation and nuclear assets, ("heritage contracts" for short) may provide a means to reduce price volatility for all consumers and effectively remove that supply from potentially unfair competition with private supply. Complementary measures would be needed as well to ensure OPG does not exercise market power with respect to its assets not covered by contract.

The processes for identifying, measuring and addressing stranded investment also needs to be re-examined in the light of the substitute for the Market Power Mitigation Agreement, plans to phase out coal-fired generation, proposed new contracting measures and other recommendations the OPG Review

Committee may make with respect to the future use of OPG assets.

OPG existing assets have a major role to play in maintaining a diverse, cost-competitive supply of power in Ontario.

Restructuring OPG could impact energy supply and prices.

In considering the best use of OPG's assets, we expect that the Review Committee and the Government will take account of the impact decisions on the future use of nuclear capacity, hydro assets and coal fired generation will have on Ontario's power supply mix and on the resulting supply and cost of power in Ontario.

Related Recommendations

1. Ontario should move toward a power sector based increasingly on longer term contracts among multiple buyers and multiple sellers. Transition measures, outlined below, will be needed to accelerate the attainment of this ultimate goal.
2. The spot market should continue to operate as a balancing market to ensure efficient resource utilization and dispatch.
3. The market should be structured so as to provide efficient signals for supply planning and demand response. The IMO should proceed with work currently underway that could lead to the introduction of a day ahead market. A spectrum of futures markets should also be developed.
4. The Government should provide guidance to the IMO on the desirable composition of supply and demand in the Ontario electricity system, in terms of diversity of generation mix, environmental criteria, regional supply needs, the role of imports, and other matters.
5. The IMO should develop a long-term integrated system plan within the context of government policy direction and in consultation with the Government, the Ontario Energy Board, potential private investors, major load customers, transmitters and others, to guide development of the supply and demand resources needed to meet the power needs of Ontario consumers.

6. Given the long lead-times associated with some of the supply options available to Ontario and recognizing the life expectation of certain major facilities, the IMO should project supply and demand trends for 25 years, rather than the current 10 years.
7. The IMO should determine adequate reserve margins for Ontario, consistent with international standards for adequacy and reliability, and should be given the authority necessary to ensure these margins are maintained.
8. As a transition measure, the Government should move quickly to designate, or create, an agency to provide the cost recovery certainty investors in new supply capacity currently require. With the appropriate governance and other safeguards to ensure against any possible conflict of interest, the IMO could be empowered to administer such measures. The measures available to the contracting party must be flexible enough to address the diverse timing and financing needs associated with various new supply and demand options. Any costs associated with this resource adequacy activity would be recovered from the customers.
9. The portfolio of contracts developed pursuant to the previous recommendation should reflect the short-term, medium-term and long term power needs of the market, as well as the Government's guidance on desired supply mix, and should be achieved through open and accountable processes. These processes should encourage investors and generation developers to bring forward a wide range of proposals to address Ontario's power needs, including conservation measures and distributed generation initiatives.
10. The OEB should approve procedures for the contracting agency to use in carrying out its responsibility for ensuring adequate resources and should ensure that the process is prudent, fair, open and accountable and are in the public interest.

11. Over time, the Ontario market should increasingly be based on contracts negotiated between multiple buyers and multiple sellers. To accelerate the development of a contract-based market, work should commence toward the development of parties (also known in the industry as "load serving entities") who would take on responsibility for acquiring electricity for customers who do not contract with retail or wholesale suppliers. We expect that there would ultimately be six to eight of these "load serving entities" to serve the Province. Parties who might be able to play this role could include wholesalers, retailers, and subsidiaries of local distribution companies.
12. As new load serving entities develop, the IMO should transfer energy contracting responsibility to them to as great a degree as possible, while still ensuring adequate power supply, in accord with the desired supply and demand mix.
13. The Task Force recognizes that the changes proposed in this report may commercially impact the private sector companies that were willing to make an early commitment to Ontario either through the NUG contracts or more recent investments, and it concludes that measures should be developed to ensure that generators are not penalized as a result of the changes.
14. The siting and approvals processes for new generation and transmission projects should be streamlined and accelerated. Clear time limits should be built into approvals processes. A task force reporting to the Minister of Energy should be established to complete a review of Ontario regulatory and approvals processes, with a view to ensuring that processes in this province match best practices elsewhere.
15. Ontario should move towards a market with rules that promote investment in distributed generation.
16. The Ontario Energy Board should assess the public costs and benefits associated with distributed generation solutions and ensure that projects which reduce system costs benefit from these cost savings.

17. Hydro One and local distribution companies should help facilitate distributed generation and their return on investment should not be negatively impacted by accommodating the increased market share of distributed generation or the potential stranding of transmission and distribution assets, should be taken into account by the OEB when considering rate applications.
18. Distributed generation facilities should be able to compete on a level playing field with other supply and demand side initiatives. The level playing field should include consideration of system benefits including security of local supply, energy efficiency and emission reductions, and local commercial and industrial competitiveness.
19. The construction of distributed generation facilities should not reduce the entitlement of a consumer to its share of any "Heritage Power" from existing OPG facilities available at stable, regulated rates. Similarly Heritage Power should not impede distributed generation projects where they provide positive public benefits.
20. The IMO's market rules should be amended to encourage load serving entities, when created, to purchase electricity produced by DG plants connected to local distribution systems.
21. Rate structures, market mechanisms and building codes and standards should be put in place to encourage and facilitate the use of emergency and stand-by generation as grid support during periods of high peak demand.
22. Ontario should expand its comprehensive tax incentive program to include a broader definition of distributed generation investment.
23. Renewable power technologies such as water, wind and biomass can provide a significant amount of new supply. In order to achieve the 2007 target of an additional 5% of the Province's power from renewable resources, and its 10% target for 2010, the Government should move quickly to implement its Renewable Portfolio Standard.

24. The Government should maintain existing coal-fired generation units as required until adequate new power supplies and demand reduction measures are in place. Having made the decision to close coal-fired generation, the Government should quickly develop generation, transmission and conservation alternatives including clean coal technologies, if the latter are feasible within the target emissions levels.
25. The respective roles and responsibilities of the Government, the Ontario Energy Board, the Independent Market Operator, OPG, Hydro One and local distribution companies should be clearly and distinctly spelled out and communicated to the public.
26. Research and innovation are important aspects of building a leading-edge electricity sector in Ontario capable of developing creative supply and demand solutions to the Province's power needs. Government should work with industry and universities to support research and innovation in the electricity industry through Centres of Excellence for Electricity and Alternative Energy Technology, and other mechanisms.
27. Governments, corporations, educational institutions and employees and their associations should work together to ensure that Ontario continues to have the skilled workers needed as the electricity sector goes through both major demographic change and the rebuilding of the Province's electricity system over the next 15 years. The electricity industry needs to become a career path of choice for Ontario's youth.
28. The Government of Ontario should work with the federal Government and its agencies to ensure consistent, streamlined and effective regulation. This applies in several areas, including nuclear regulation, permitting of wind projects on the Great Lakes, Kyoto compliance measures, inter-provincial and international transmission.
29. The Government should adopt internal procedures to ensure that the importance of bringing on new generation and transmission, and of promoting conservation, are given adequate recognition by all ministries and agencies.
30. Ontario should expand its electricity trade capabilities with neighbouring states and provinces, while maintaining its policy independence.

6. Enhancing the Reliability and Responsiveness of Ontario's Electricity Grid

6.1 Introduction

Ontario's transmission system is one of the largest transmission systems in North America. The system, owned and operated primarily by Hydro One, is a high voltage integrated network with 29,000 circuit km of line across the entire province operated in concert with the rest of the Northeast and Midwest electricity grid. Although the existing power delivery infrastructure is adequate to meet today's basic needs, it will not satisfy our needs over the coming decades without expansion and improvement.

Transmission infrastructure provides access to a wide range of clean sources of power, fosters competition and helps ensure security, adequacy and diversity of supply.

Transmission is essential public infrastructure and plays an important role in ensuring an adequate, reliable, cost-competitive and environmentally responsible electricity supply for all Ontarians. Enhancing the responsiveness and reliability of Ontario's transmission grid will encourage new generation investment and help attract new industry and jobs to Ontario. Transmission upgrades also improve the reliability of delivery by enabling emergency support and sharing of reserves.

Transmission reinforcement within Ontario provides customers access to new sources of generation such as cogeneration facilities, waterpower, and wind farms.

Interconnection with our neighbours is a prime driver of reliability.

Ontario's transmission system is already more interconnected with neighbouring provinces and states than any other system in Canada. Enhancing the grid further through the development of additional transmission interconnections can play an important role in bringing the full benefits of supply from wider markets to Ontario consumers.

FIGURE 6.A

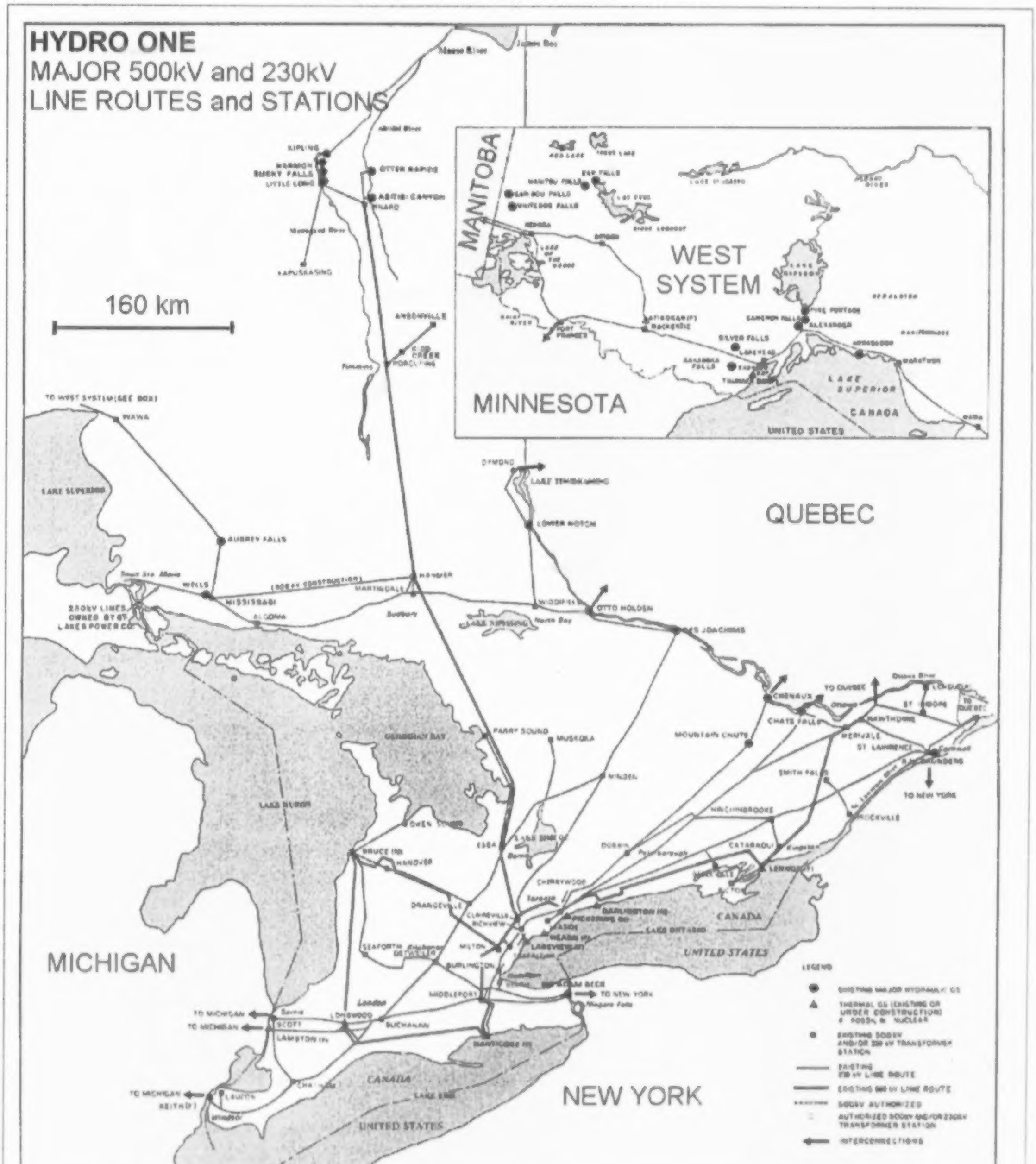
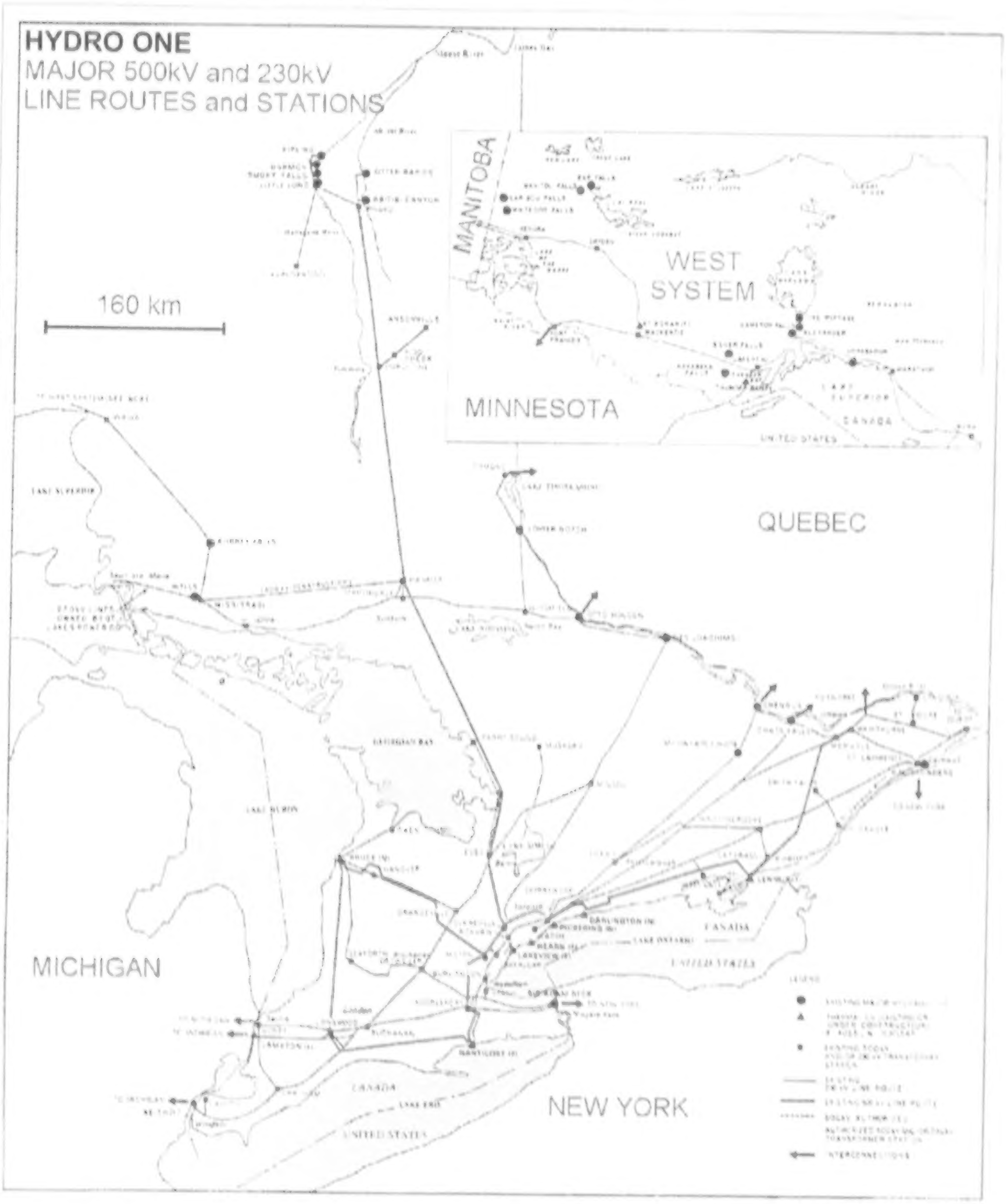

HYDRO ONE
MAJOR 500kV and 230kV
LINE ROUTES and STATIONS
160 km
MANITOBA
WEST
SYSTEM
MINNESOTA
LAKE SUPERIOR
CANADA
UNITED STATES
QUEBEC
MICHIGAN
NEW YORK
LAKE SUPERIOR
LAKE HURON
GEORGIAN BAY
LAKE ONTARIO
LAKE ERIE
KIPLING
HARMON
SMOKY FALLS
LITTLE LONG
OTTER RAPIDS
ABITIBI CANYON
PINARD
KAPUSKASING
ANSONVILLE
PORCUPINE
TO WEST SYSTEM (SEE BOX)
WAWA
AUBREY FALLS
WELLS
MISSISSAGI
ALGOMA
230kV LINES OWNED BY GT. LAKES POWER CO.
HANMER
MARTINDALE
Sudbury
DYMOND
LOWER NOTCH
OTTO HOLDEN
DES JOACHIMS
North Bay
PARRY SOUND
MUSKOKA
MINDEN
CHENAUX
CHATS FALLS
TO QUEBEC
HAWTHORNE
MERIVALE
ST LAWRENCE
TO NEW YORK
MOUNTAIN CHUTE
SMITH FALLS
HINCHINBROOKE
BROCKVILLE
CATARAQUI
LENNOX
DOBBIN
CHERRYWOOD
BRUCE
HANOVER
OWEN SOUND
ESSA
ORANGEVILLE
CLAIREVILLE
MILTON
SEAFORTH
BURLINGTON
MIDDLEPORT
PICKERING
LAKEVIEW
NANTICOKE
LONGWOOD
BUCHANAN
SCOTT
LAMBTON
TO MICHIGAN
CHATHAM
KEITH
Windsor
LEGEND
● EXISTING MAJOR HYDRAULIC GS
▲ THERMAL GS (EXISTING OR UNDER CONSTRUCTION) F FOSSIL N NUCLEAR
● EXISTING 500kV AND/OR 230 kV TRANSFORMER STATION
EXISTING 230 kV LINE ROUTE
EXISTING 500 kV LINE ROUTE
500kV AUTHORIZED
AUTHORIZED 500kV AND/OR 230kV TRANSFORMER STATION
INTERCONNECTIONS

FIGURE 6.A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CANADA
UNITED STATES
BRUCE (N)
NANTICOKE (N)
CANADA
LAKE ERIE
UNITED STATES
NEW YORK
LEGEND

6.2 Transmission Planning

Long timelines make planning for transmission crucial.

Ensuring that the needed transmission is built in a timely fashion is challenging. Planners must anticipate new generation and load growth well into the future. Securing rights of way and the necessary environmental and regulatory approvals takes years. Capital requirements are large and the payback period is long. Investment recovery with appropriate regulatory certainty and adequate return on capital must be assured to secure financing.

Hydro One needs to take the planning lead.

Approximately 97% of Ontario's electricity demand flows through Hydro One's transmission system. Hydro One has comprehensive responsibility for planning, maintaining and operating Ontario's transmission system. Within the context of the integrated system plan, Hydro One should develop a comprehensive long-term transmission development plan through consultation with generation developers, load customers, the IMO, local transmitters and other interested parties, extending out at least 10 years and should update that plan annually.

The plan should:

- anticipate load growth;
- ensure that transmission reliability for the province is maintained/improved;
- maintain sufficient transmission reserve capacity to deal with a range of supply contingencies;
- ensure that transmission is not a barrier to needed generation development; and
- address constraints and help facilitate competition among suppliers.

6.3 Upgrades

Ontario's transmission system requires upgrading and reinforcement. Approximately $4 billion in system upgrades and expansion may be required over the next 10 years.

Market drivers for transmission upgrades are not proven.

Some North American markets have been designed on the expectation that congestion would result in regional price differentials which would provide the necessary incentive to construct new transmission infrastructure. This has not proven to be a viable way to build necessary infrastructure.

The Task Force feels that implementation of specific projects should proceed subject to review by the OEB and a determination of whether the investment is needed and in the broader public interest.

6.4 Enabling New Supply within Ontario

The Task Force views the transmission network as a shared use network that enables customers access to economic and diverse sources of generation, and provides assurance and flexibility in supply.

Distributed generation should be encouraged.

Generation embedded within the distribution systems can contribute to meeting the province's supply needs, and should be encouraged where economic. The associated public interest benefits should be recognized in determining the allocation of transmission charges to distributors with new embedded generation, while also recognizing that the Province's investment in existing transmission assets needs to be recovered from electricity customers.

In light of the urgent need to develop new provincial power supply, transmission should not be a barrier to and, indeed, should facilitate new generation. Costs for transmission enhancements to incorporate new generation should be recovered through the market or through rates to the extent justified by public interest benefit.

The OEB should consider the public interest benefits of distributed generation facilities, balanced by the need to recover investments in existing transmission assets, and update its guidelines for the timely and economic connection of distributed generation facilities accordingly.

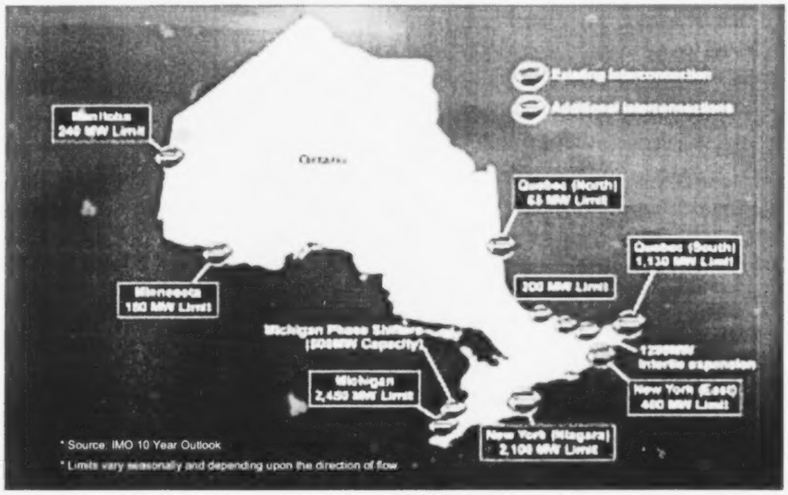
6.5 Interconnections

Ontario is more reliant on imports than in the past.

Historically, Ontario's interconnections with neighbouring provinces and states served primarily to enhance reliability and to allow the province to take advantage of differences in seasonal generation and consumption patterns with neighbouring markets. While built primarily to ensure reliability, these interconnections have generally paid for themselves quickly by facilitating expanded electricity trade. With the closure of much of Ontario's nuclear fleet several years ago, the interconnected markets have offered an indispensable source of peak supply.

As in other markets that have been opened to competition, the transmission grid increasingly serves as a highway for broader competition and trade among regional markets. Ontario also enjoys the particular advantage of being located between two of North America's leading exporters of clean waterpower—Manitoba and Quebec. Over the longer term, Newfoundland and Labrador could also become a significant supplier of power to Ontario.

FIGURE 6.B


Existing Interconnection
Additional Interconnections
Manitoba
240 MW Limit
Ontario
Quebec (North)
65 MW Limit
Quebec (South)
1,130 MW Limit
200 MW Limit
Minnesota
150 MW Limit
Michigan Phase Shifters
(500MW Capacity)
1250MW
Intertie expansion
Michigan
2,450 MW Limit
New York (East)
400 MW Limit
New York (Niagara)
2,100 MW Limit

* Source: IMO 10 Year Outlook
* Limits vary seasonally and depending upon the direction of flow

Isolation is not an attractive option.

For reliability, the benefits of being connected to other systems far outweigh the risks. Isolation would require full self-reliance and this would be very expensive. Ontario is part of the North American eastern interconnection, providing a substantial reserve cushion in the event of a sudden or extended major generation outage within Ontario. Isolation would mean that reserve margins in Ontario would need to be increased greatly to deliver the same level of reliability to Ontario consumers.

During the course of our deliberations a "blackout" event occurred that effected a significant area across the North Eastern grid network. A number of panels were tasked with reviewing the event and making recommendations. The event had a significant impact on Ontario both in terms of large disconnections of supply and in relation to the return of normal supply capability. While the Electricity Conservation and Supply Task Force has not been specifically tasked with incorporation of the recommendations of these "blackout" findings, we believe that the proposals we are

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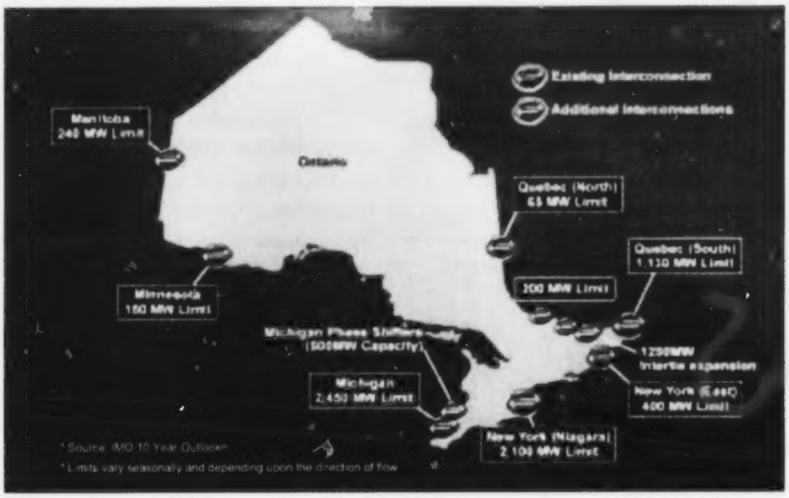
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In addition to working with Ontario generators, Hydro One should continue to proactively develop enhancements to interconnection capacity with Manitoba, Quebec and other jurisdictions, as such enhancements potentially have net public interest benefits. Interconnection investments should be included in the rate base where warranted. However, where new interconnections are primarily used for imports of power, as is likely the case for Manitoba, recovery of the investment could be incorporated into long-term power purchase or power sharing agreements, in order to reflect the total cost of the new supply.

6.6 Technology

Running the grid is becoming more complex.

The Province, through the IMO and Hydro One, has made recent investments in new network management systems and is moving communications and control systems to digital technologies. However, much of the core system is based on "old" technologies, as is also true for North America in general. This was adequate for the historical model, where generation, transmission and distribution in a given region was centrally planned and controlled by a single "vertically-integrated" utility, local load was primarily served by local generation, and transfers between systems were relatively limited.

Although the transmission system continues to serve Ontario well, the environment within which transmission operates is changing. Markets are more complex, large power transfers over large distances and across multiple regions are increasing, and modern economies have an increasing need for higher levels of reliability and power quality. New technologies hold the promise of a "smart, self healing grid" with the ability to:

- Control power flows across the network, resulting in improved asset utilization and improved protection against major outages;
- Ensure delivery of higher quality power to meet customer needs;
- Provide more timely and comprehensive information to customers; and

- Connect an increasing number and variety of generators.

The government must support innovation in this area.

As with other parts of the electricity system, research and innovation are important aspects of building a leading-edge transmission capability in Ontario. Government should work with industry to support research and innovation in transmission through Centres of Excellence. Other mechanisms, such as accelerated depreciation, and the recovery of development costs via the rate base, should be put in place to accommodate uncertainties associated with implementing new and innovative solutions.

6.7 Regulatory Processes

Uncertain regulatory and siting processes have been a major barrier to investment in transmission in North America over the past few years. Obtaining approvals often requires several sequential processes resulting in long time frames of up to five years or more. The costs to obtain approvals can be substantial for a major transmission project. There is a need to ensure consistency in the cycle times for approvals of generation and transmission projects.

Regulatory processes must be streamlined.

There is a need to clarify regulatory accountabilities and, while ensuring public input, to expedite approval processes. This would encourage a proactive initiation of potential projects and also provide assurance to new generators of the timely availability of required transmission in Ontario. Approval authorities in Ontario should, to the extent possible, rest with a single body, the OEB. (One exception is the environmental assessment process, which will remain with the Ministry of Environment). New transmission should be proposed by Hydro One or other transmitters, and reviewed and approved by the OEB, with appropriate input from the IMO and other interested parties.

Effectively developing new rate base facilities requires a clear framework for assessment. The OEB should establish a framework which assesses the broad public interest benefits provided, and determines the extent to which the costs of particular investments should be recoverable through the rate base.

Approval processes for essential expansion in electricity transmission infrastructure should be streamlined. In particular, there should be firm timelines for decisions, without compromising transparency and rigour. Processes should occur simultaneously, rather than sequentially, to the extent possible. In particular, environmental approvals should run in parallel to other regulatory approvals. Processes similar to the OEB's "Leave to Construct" review are limited to periods of six months or less in a number of jurisdictions.

6.8 An Integrated Solution

Transmission is a key enabler of new supply solutions in Ontario. As such, transmission services, and the regulatory bodies which oversee them, are an important part of the framework to address Ontario's power needs.

Related Recommendations

1. The transmission grid should be treated as essential public infrastructure. Expansion and improvement of the shared grid, when determined by the OEB to serve the public interest, should be paid for by customers through transmission rates.
2. Continued participation in the interconnected regional market helps provide reliable and affordable power for Ontario. Ontario should continue to work with neighbouring markets to eliminate barriers to trade in electricity and ancillary services.
3. The OEB should set and enforce transmission and distribution reliability and service standards, taking into account the IMO's responsibility for overall system reliability and security including the administration and compliance enforcement for the IMO-controlled grid.
4. Within the context of the integrated system plan, Hydro One should develop a comprehensive long-term transmission development plan through consultation with generation developers, load customers, the IMO, local transmitters and other interested parties, extending out at least 10 years and should update that plan annually. This plan should anticipate system expansion needs and address them in a proactive fashion.

5. In light of the urgent need to develop new provincial power supply, transmission should be a facilitator of new generation, not a barrier to it. Costs for transmission enhancements to incorporate new generation should be recovered through markets or through rates, to the extent justified by public interest benefit as determined by the OEB.
6. The OEB should issue guidelines that encourage the timely and economic connection of distributed generation facilities. Any resulting stranded transmission and distribution costs should be recovered from the ratepayers.

7. Conclusion: A Framework to Address Ontario's Power Needs

7.1 Coping with a Changing World

The Energy Competition Act of 1998 was an ambitious effort to create institutions that would serve Ontario's electricity sector well in the new century. It relied heavily on well-functioning markets to deliver the benefits of competition.

Key features included:

- Prices and incentives that would arise primarily from the IMO-administered spot market. Retailers, wholesalers and energy traders were expected to provide the necessary hedges against spot market volatility.
- Consumers could contract with retailers for fixed rates or face spot market prices which would give them clear market signals. Transitional price impacts, to the extent they occurred would be dealt with through after-the-fact mitigation via Market Power Mitigation rebates.
- Retailers and energy service companies were expected to offer a wide range of green energy and energy saving options.
- A "cap-and-trade" emissions market would lead to cleaner air.
- Clean-burning gas was expected to provide most new generation and would help address the need for cleaner air.
- Many generation and transmission projects were slated to compete for opportunities to supply local and broader markets.
- OPG assets would be decontrolled over time.
- Local distribution companies would be commercially driven pure wires companies with retail activities restricted to unregulated affiliates.
- Competitive transmission, with investment driven primarily by financial transmission rights, would compete with local generation projects to ease congestion as it arose.

7.2 What changed?

The financial markets expected to underwrite new capacity were severely impacted by Enron's collapse and the demise, at least temporarily, of the long-term energy trading market. This loss undercut merchant generation, merchant transmission and robust emissions trading. Long-term offtake contracts with creditworthy entities are now necessary.

The Ontario Government intervened repeatedly in the market. This reduced investor interest and the ability to finance projects in the Province's power sector.

Delays and cost increases in returning the four Pickering A nuclear units to service contributed to reduced supply and higher and more volatile prices. This also added to concern that the Government would continue to make uneconomic investment decisions that would damage the competitive position of competing suppliers in the market.

The development and construction of new gas-fired facilities slowed, primarily driven by the retreat of the financial markets from the electricity industry, but compounded by spiking in natural gas prices and concerns over long term supplies. Gas became increasingly viewed as a fuel most appropriate for immediate and peaking operations, rather than baseload.

Delays in expanding the interties with Quebec and Michigan added to near-term supply concerns and slowed the development of a more integrated regional market.

Exceptional weather and tight supply in the summer and fall of 2002 led to unexpected price increases and volatility. This produced a consumer backlash that led to the subsequent price freeze. The freeze in turn further undermined investor confidence and removed the incentive to conserve.

The new Government sees the health and environmental consequences of burning coal to produce power as unacceptable and has committed to phase out coal-fired generation by 2007. This creates a need for major additions of new supply and demand reduction to begin immediately. It also creates concern about the competitiveness of Ontario's power costs with coal-based markets to the south and the potential impact that higher Ontario costs could have on Ontario industry.

The Government also introduced aggressive targets for renewable generation and demand-side management. This will help provide needed clean new supply and reduce demand. It also signals a willingness to supplement market approaches to achieve policy goals as necessary.

The Government's commitment to ongoing ownership of the province's transmission grid and generation assets makes the implementation of the existing Market Power Mitigation strategy difficult, if not impossible, to achieve and requires new means to address concerns about market power and standard investments.

The August 14 blackout in northeastern North America points to a need for improved coordination, more stringent regulatory oversight and grid enhancements to improve reliability.

7.3 Where are we now?

The Task Force has heard from potential investors that there are few credit-worthy counterparties with whom they can contract. In such an environment, investments in supply and demand management are simply unfinancable.

Ontario faces tight supply and looming shortfalls as the coal-plant phase out deadline approaches.

Prices for small consumers are fixed, pending OEB design of a new approach.

There have been few offerings of green energy or conservation tools, due in part to the price freeze.

Except for cogeneration and distributed generation applications, natural gas is now largely seen as a fuel for intermediate and peaking capacity, rather than as a fuel for baseload generation.

There is increased recognition of the value of fuel diversity in the province's supply mix.

OPG decontrol is on hold.

LDCs remain uncertain about their future roles.

Merchant transmission is no longer seen as a viable option in Ontario or elsewhere in North America.

Renewable generation and conservation targets are in place. Developers are awaiting implementation mechanisms.

Stronger enforcement of grid operating standards across North America is inevitable.

7.4 The Task Force's Action Plan

This report outlines an action plan that can begin to move the Ontario electricity sector towards a sustainable future based on effective competition within a responsible planning and regulatory framework. Specifically, it provides a path toward:

- Access to stable regulated prices that reflect the true cost of power for all consumers who do not contract with generators, wholesalers or retailers.
- Prices that reflect peak and off-peak differences for consumers with smart meters.
- Informed consumers with the facts and technology they need to manage their power consumption.
- Continued choice of retail suppliers for all consumers.
- Highly reliable power supply, with standards enforced by the OEB.
- A diverse supply and demand mix, including renewables, distributed generation, and conservation.
- A market increasingly based on longer term contracts among multiple buyers and multiple sellers.
- An IMO-administered capacity market and resource adequacy mechanism.
- The development of load serving entities able and willing to enter into longer term contracts to procure power to serve default supply customers.
- A spot market that serves primarily as a balancing pool.
- Enhanced opportunities for demand response to compete against supply options on a level playing field in meeting Ontario power needs.
- A transmission grid plan that anticipates the need for new generation, load growth and interties and proactively builds to meet these requirements.
- Expanded interconnections and trade with neighboring provinces and states.
- Increased responsibility for the Government, OEB and IMO to plan for, and ensure, adequate supply and reserve margins.

- Partnerships between industry and Government in support of innovation, including an Energy Centre of Excellence which will act as a focus for the development of technology and approaches that build on Ontario's inherent strengths in the energy industry.
- Training and education that ensure the continuing development of the expertise needed in Ontario's electricity industry as it meets the challenges of demographic renewal and the fundamental rebuilding of the province's electricity system. The power sector should provide a "career of choice" for Ontario's youth.
- Clearly defined roles in the market:
    - Minister of Energy role in providing clear and consistent policy direction.
    - Independence for the OEB and IMO in regulation and enforcement.
    - A broader role for the IMO in planning and ensuring resource adequacy.
    - OPG as investor of last resort and partner in development of its existing facilities where that is practical.
    - Hydro One as regulated provider of essential public infrastructure.
    - LDCs with a clear role in promoting and delivering conservation.
    - Ongoing roles for retailers in providing innovative price, service and conservation options to consumers.
    - Private investors as the primary source of new supply.

7.5 Transitional Measures

A number of transitional measures are urgently required to address the immediate needs of the market and put us on the path to this new market, including:

- A mechanism to backstop new investment in both supply and demand response which could potentially be administered by IMO.
- Protection for existing private investors in the electricity market.

- Replacement of MPMA with simpler mechanisms such as "heritage contracts".

These transitional measures must be developed with all possible speed, and within a regulatory framework that provides accountability and transparency to ratepayers and fairness across ratepayer groups.

7.6 Conclusion

The Electricity Conservation and Supply Task Force represents a broad cross-section of those who produce, deliver and consume electricity. We spent six months examining the electricity industry in Ontario and the range of alternative paths forward. We arrived at a strong consensus that the way the industry currently works in Ontario has to change if it is to ensure the adequate, reliable, affordable and clean power supply consumers, large and small, need.

The action plan outlined above is designed to provide the means for Ontarians working together to successfully address the needs for new power supply and aggressive conservation. Implementing this plan will require a number of tough choices on the part of the Government, the industry and every citizen of Ontario. We believe they are up to the challenge.

APPENDIX 1

Desired Sustainable State

The Task Force spent considerable time discussing the characteristics of what we call "the desired sustainable state". The chart below describes the future electricity system to which our recommendations point.

Task Force's Vision: "Desired Sustainable State"

1. There is an adequate and reliable supply of power available to Ontario consumers, from either local sources or assured imports.
2. Ontario power prices are responsive to supply and demand, are reasonably stable, are seen as fair and transparent, and are competitive with those in neighbouring U.S. states.
3. Large volume consumers in Ontario are able to purchase their electricity from the spot market, or under long term contracts with competitive suppliers or other providers.
4. Small and mid-volume consumers in Ontario are able to choose between competitive retailers offering a wide array of power products, or the local provider of default supply.
5. Default supply is procured and provided in such a way that small and mid-volume consumers are not exposed to price volatility.
6. The market is composed of multiple buyers and multiple sellers, none of whom is able to influence the market price on a sustained basis.
7. Generation investments are made primarily by private sector firms operating in a for-profit context.
8. The Ontario market welcomes new players and does not discriminate between incumbents and new participants.
9. There is sufficient regulatory and policy certainty that generators, transmitters, distributors and consumers can obtain financial backing for viable investment projects.
10. Most market participants have sound credit ratings.

11. Ontario has a diversified generation mix, including significant proportions of clean and renewable generation, and is not overly dependent on a single technology, fuel, or imports.
12. All consumers have a good understanding of how the electricity market works, and have the technical capability and incentives to efficiently manage their power demand.
13. Ontario has developed a conservation culture. Energy efficiency is continuously improving in the province.
14. The Ontario market evaluates new conservation and demand response initiatives on a level playing field basis with new supply initiatives.
15. The Ontario power industry is a technological leader. The Ontario Centres of Excellence provide long-term leadership in the development of new technologies and markets.
16. The Ontario power industry is a leader in public and worker safety.
17. The Ontario power industry represents an attractive career choice.
18. Ontario is an open access jurisdiction that supports trade in electricity and related products and works co-operatively with other jurisdictions to eliminate barriers to electricity trade and investment.
19. Ontario Hydro's stranded debt has been eliminated.
20. Roles and responsibilities are clearly defined for the Ontario Energy Board, the Independent Market Operator, the Ontario Electricity Financial Corporation, and the local distribution companies.
21. The IMO, the OEB and the Government consult consumers and industry stakeholders prior to implementing significant changes in the rules and policies governing Ontario's electricity system.

APPENDIX 2

Glossary

Aggregators

Entities that contract with customers and then offer the aggregated total supply or demand reduction response to the market.

Ancillary Service

Ancillary services are functions required to support the reliable operation of the transmission and generation system. They are coordinated by the IMO and include various types of operating reserves, frequency and voltage control, black-start capability, load following and more.

Balancing Market

A market which balances any hourly mismatch between supply and demand, bridging the difference between scheduled or contracted flows and actual demand.

Base Load

The minimum continuous load over a given period of time.

Benefit Sharing

A model by which regulators allow energy market participants to make a financial return on efforts which generate system benefits (for example, by reducing demand through a conservation program).

Bill 210

The Bill that became the Electricity Pricing, Conservation and Supply Act, 2002, outlining the Ontario Government's new policies regarding the electricity market. The most notable policy changes were the introduction of a rate freeze for low volume and designated customers (4.3 cents per KWh) and the freezing of transmission and distribution rates.

Biomass

Energy resources derived from organic matter, including wood, agricultural waste, and other living-cell material that can be burned to produce heat energy.

Buy Side

Those parties which purchase energy, either through contracts or on the spot market.

Capacity

The maximum power output for which a generating unit, generating station or other electrical apparatus is rated. Common units include kilowatts (kW) and megawatts (MW). Also used to refer to the maximum potential output for the entire electricity system.

Capacity Reserve Market

A market in which generating capacity beyond expected energy demand is paid to be available to meet unexpected needs.

Centre of Excellence

An organizational unit which is devoted to researching, developing and disseminating best practices in a specific subject area. In this context, Ontario has committed to invest $20 million in a new Centre of Excellence for Electricity and Alternative Energy Technology involving five Ontario universities.

Clean Coal Technologies

Technologies designed to enhance both the efficiency and environmental acceptability of coal extraction, preparation, and use.

Cogeneration

The combined production of electricity and useful heat. Cogeneration is often employed at industrial plants where the heat produced to generate electricity can be utilized subsequently in the manufacturing processes and for general space heating. Cogeneration facilities use significantly less fuel to produce electricity and thermal energy than would be needed to produce them separately.

Combined Cycle Plant

An electricity generating station that uses waste heat from its gas turbines to produce steam for conventional steam turbines.

Congestion

A condition on a transmission or distribution system that occurs when insufficient transfer capacity is available to implement all of the preferred schedules simultaneously.

Conservation

Any activity which reduces the amount of electricity used overall, or shifts the consumption of the energy from a peak time to a time of lower demand.

Day Ahead Market

A forward market in electricity, conducted a day before real-time operations.

Default Supply

Power made available to customers who are neither wholesale market participants nor customers of competitive electricity retailers.

Demand Response (DR)

Reduction in electricity use in response to peak pricing or request from the IMO or a Load Serving Entity.

Demand Side Management (DSM)

Any program or action which reduces the amount of energy consumed. This can include reducing energy-consuming activities (e.g. turning lights off) or doing activities in a more energy-efficient manner.

Direct Load Control (DLC)

The customer's service provider, through some form of dispatch signal, controls a customer's consumption. Typically, a few appliances, such as water heaters or air conditioners would be controlled.

Dispatch

The process by which the IMO directs the real time operation of a supplier or a purchaser to cause a specified amount of electric energy to be provided to or taken off the system.

Dispatchable

A Generator or Load that is capable of responding to real-time control (instructions every five minutes) from IMO.

Distributed Generation (DG)

Electricity generating capacity located close to the customers it serves.

Distribution

The delivery of energy to retail consumers connected to the low-voltage (50kV or less) power system.

Distributor

Any entity that owns and is responsible for the maintenance of local distribution network systems which connect the bulk transmission grid to the end-use customer.

Economic Demand Response

In contrast to demand response based strictly on market price signals (i.e. customers decide not to consume at certain price points), economic demand response involves some form of payment for customers not to consume.

Electricity Act (Bill 35)

The key piece of provincial legislation, enacted in June 1999, intended to facilitate competition in the generation and sale of electricity. Resulted in the creation of OPG, Hydro One and the IMO (and two other corporations) as successors to Ontario Hydro. It also set the stage for competitive wholesale and retail energy markets.

Electricity Distributors Association (EDA)

The trade association of Ontario's local electricity distributors. Its members include both publicly and privately owned companies.

Electricity Intensity

The amount of electricity used to produce goods or services.

Electricity Wholesale Market

Wholesale electricity markets are comprised of transactions between buyers and sellers of bulk power at high-voltage transmission. Sellers in the wholesale market do not sell electricity to end users such as residential or commercial customers, but do sell to large volume consumers who are directly connected to the transmission system.

Emergency Demand Response (EDR)

Typically, demand response that is utilized strictly for reliability purposes, just prior to implementing more drastic measures such as rolling blackouts. An example is voltage reduction.

Emergency Load Response Program (ELRP)

End-use customers are compensated for voluntarily reducing load during an emergency event.

Emission

A discharge into the air, land, or water from an industrial process, transportation vehicle, household activity, or other source.

Energy Efficiency

The amount of energy used to produce a specific good or undertake a particular task. The government may set standards for energy efficiency of particular devices, as well as for buildings.

Federal Energy Regulatory Commission (US FERC)

The US federal agency regulating price, terms and conditions of power sold in interstate commerce and that of all transmission services.

Financial Transmission Right

The right to receive the price difference arising from congestion between one defined point on the transmission system and another.

Fossil Fuel

Remains of organisms embedded in the earth's crust, with high carbon and/or hydrogen content and used as a source of energy (e.g. coal, oil, natural gas).

Futures Market

A market in which standardized contracts for the future delivery of commodities (including electricity) or financial instruments are traded.

Generator

An entity that owns / operates an electricity generating plant.

Geothermal Energy

Energy extracted from the earth usually in the form of steam that can be used for ground source heat pumps, water heating, or electricity generation.

Gigawatt-hour (GWh)

One million kilowatt-hours.

Green Field Investment

Investments in new generation or transmission facilities that are located on new sites.

Green Power

Electricity deemed to be generated in an environmentally less intrusive manner than most traditional generation, usually in accordance with standards established by government or regulatory agencies; sources include wind, water, landfill gas, and solar.

Grid

A network of electric power lines and connections.

Heritage Power

Power provided from existing Government–owned assets which is sold to ratepayers at a price that reflects the historical costs of the associated assets.

Hourly Ontario Energy Price (HOEP)

The hourly average of the uniform Ontario energy prices determined for each five-minute dispatch interval as published by the IMO for the settlement hour.

Hydro One

A company established by the Electricity Act, 1998, whose principal business is the transmission and distribution of electricity in Ontario and to interconnected markets. It is 100% owned by the Province of Ontario.

IMO Controlled Grid

The transmission systems with respect to which the IMO has authority to direct operations.

IMO Market Rules

Rules administered by the IMO, setting forth the terms and conditions for the operation of the marketplace. They include operating rules, rules for dispute resolution and connection requirements, among others.

Independent Electricity Market Operator (IMO)

A non-profit, regulated corporation established by the Electricity Act. Roles involve overseeing the operation of the wholesale electricity market and managing the reliability of the high-voltage power system.

Interconnected System

Two or more individual transmission systems that have one or more interconnecting tie lines.

Intermediate Generation

Process of producing power for regular periods but not full time. Typically, intermediate generating plants run about 8-16 hours each day during peak hours. Examples can include coal-fired generation, waterpower and combined-cycle gas-turbine generation.

Intermittent Power Source

A generator, such as a wind turbine, whose output may vary considerably over short periods due to the variability and unpredictability of its external energy source.

Interruptible Load

Energy made available under an agreement that permits curtailment or interruption of delivery at the option of the supplier.

Intertie

A transmission line that interconnects two adjacent control areas.

Kilowatt (KW)

1,000 watts (W) or 1.34 horsepower (hp).

Kilowatt-hour (KWh)

The amount of electrical energy produced or consumed by a one-kilowatt unit for one hour (1,000 watt hours).

Landfill Gas Energy

Electricity produced by collecting and burning methane gas at landfill sites.

Lay-up

The status of equipment (such as a power plant) that has been placed in storage ("mothballed") for later use.

Line Loss

The energy lost in circuits or equipment mainly in the form of heat, when current flows through circuits.

Load

The amount of electric power or natural gas volume delivered or required at any specific point or points on a system. The requirement originates at the energy-using equipment of the consumer.

Load or Demand Management

Measures undertaken to control the level of energy usage at a given time, by increasing or decreasing consumption or shifting consumption to some other time period.

Load Serving Entity (LSE)

A company which is responsible for procuring gas and/or electricity for default consumers.

Local Distribution Company (LDC)

An entity that owns a distribution system for the local delivery of energy (gas or electricity) to consumers.

Locational Marginal Price (LMP)

A form of congestion pricing that determines the price of energy at specific locations on the grid, as the cost of serving an increment of load at that location.

Marginal Energy Cost

The sum that has to be paid for the next increment of product or service; for example, the marginal cost of electricity is the price to be paid for each kilowatt-hour above and beyond the power supplied by currently operating generation capacity.

Market Clearing Price (MCP)

The price at which a market clears, such that there are no further gains to be made from further trading.

Market Power Mitigation Agreement (MPMA)

An agreement negotiated between the Market Design Committee and Ontario Power Generation Inc. (OPG) as a means to mitigate OPG's market power in Ontario's wholesale electricity market. Parts of it are, as a result of a directive issued by the Minister of Energy, conditions of license for OPG. The MPMA sets out market share reduction targets for OPG and provides incentives to meet these targets. In addition, the MPMA rebate mechanism provides a measure of protection for Ontario consumers of electricity against high prices.

Megawatt (MW)

1,000 kilowatts (kW) or one million watts (W). Unit of electrical power commonly used to measure the capacity of a generating station or the maximum demand of a large electricity consumer.

Megawatt-hour (MWh)

A measure of the energy produced by a generating station over time; 1 MW of power produced for 24 hours provides 24 MWh of energy (as does 24 MW produced for one hour).

Merchant Generation

Any entity that owns, builds or operates an electricity generating facility and receives the spot price or a contract price, but not a guaranteed or regulated price; includes, but is not limited to, cogenerators and small power producers and all other non-utility electrical producers, such as exempt wholesale generators who sell electricity.

Merchant Transmission

A model for investment in transmission, in which the investor takes the full usage and revenue risk of the project.

Meter

Equipment that measures and registers the amount and direction of energy quantities over a period of time.

National Energy Board (NEB)

The federal regulatory agency in Canada that authorizes oil, natural gas, and electricity exports; certifies interprovincial and international pipelines and designated interprovincial and international power lines; and sets tolls and tariffs for oil and gas pipelines under federal jurisdiction.

Non-Governmental Organizations (NGOs)

A group or corporation which is not part of any level of government, and which is focused on non-commercial issues. NGOs may be partly funded by governments. NGOs include lobbying groups, trade associations, volunteer associations, faith-based organizations, neighbourhood associations, and many others.

Non-Utility Generators (NUGs)

Generators owned by entities other than an electric utility. Also referred to as Independent Power Producers (IPPs).

Nuclear Power

Power generated at a station where the steam to drive the turbines is produced by an atomic process, rather than by burning a combustible fuel such as coal, oil or gas.

Off-Peak Period

The period of time during a day, week, month, or year when gas or electricity use on a particular system is not near its maximum.

Ontario Electricity Financial Corporation (OEFC)

A statutory, non-share capital corporation and the legal continuation of Ontario Hydro. OEFC retains services from the Ontario Financing Authority (OFA) and the Ministry of Finance to carry out its daily operations. The OFA is the agency of the Province of Ontario responsible for provincial borrowing and debt management activities. The OFA manages OEFC's debt, derivatives and non-utility generator (NUG) portfolios, and provides cash management, accounting and other financial services and support to the corporation. The Ministry of Finance manages the collection and reporting of payments-in-lieu of taxes on behalf of OEFC.

Ontario Energy Board (OEB)

A regulatory agency of the Ontario Government. It is an independent, quasi-judicial tribunal created by the Ontario Energy Board Act. Although it reports to the Legislature through the Minister of Energy, the Board operates independently from the Ministry and all other government departments in the performance of its regulatory functions and responsibilities.

Ontario Power Generation (OPG)

A company established by the Electricity Act, 1998, whose principal business is the generation and sale of electricity to customers in Ontario and interconnected markets. It is 100% owned by the Province of Ontario.

Operating Reserve

The amount of generation that is immediately at hand to offset an unexpected loss of supply.

Peak-Use Period

The period of time when gas or electricity use on a particular system is at or near its maximum and when supply is most likely to be suspended for interruptible service customers. Distributors employ techniques such as peak shaving to soften the impacts of high demand on pipelines or electricity transmission/generation.

Peaking Capacity

Generating capacity typically used only to meet the peak demand (highest demand) for electricity during the day; typically provided by hydroelectric generators or combustion turbine generators (fueled by natural gas or fuel oil).

Performance Based Regulation (PBR)

Any rate-setting mechanism that allows a utility's cost savings, incremental revenues, or other benefits to be shared between the owner of a utility (natural gas or electricity) and its customers. Returns are based on performance measured against specific criteria set by the regulator.

Photovoltaic

A means of converting solar energy into electrical energy (typically by way of photovoltaic cells, or panels comprising a number of cells).

Public Utility

An organization that provides basic services to the public, such as water, energy, transportation, or telecommunications.

Real Time Pricing

The price set every five minutes in the wholesale market by the interaction of supply and demand.

Regulator

An entity that, through power of law or some other legitimate means, has the authority to impose regulation.

Renewable Energy Sources

Energy sources that are renewed by natural processes including wind, biomass, solar, geothermal, water, and tidal.

Renewable Portfolio Standard (RPS)

A target that is established for the amount of renewable generation in the supply mix.

Request for Proposal (RFP)

A process for obtaining competing proposals from providers of a service or product.

Reserve Margin

The amount of generation capacity that must be available to meet unexpected reductions in supply.

Resource Adequacy Mechanism

A contractual mechanism designed to ensure sufficient availability of generating capacity to meet supply needs and provide sufficient reserve capacity.

Retail Market

A market in which electricity and other energy services are sold directly to consumers by competing suppliers. Also known as retail access or direct access.

Solar Energy

The radiant energy of the sun that can be converted into other forms of energy, such as heat (e.g. for water heating) or electricity.

Stepped Rates

Rate structure where the unit price rises with consumption. In 2004, most Ontario consumers will pay a stepped rate – 4.7 cents on the first 750 KWh of consumption and 5.5 cents on the consumption above this level.

Stranded Costs/Investment

Costs of a utility that cannot be recovered from market prices (for example, an electrical utility's assets that would become uneconomic in a competitive market).

Simple Cycle Generation

A manner of electricity production involving natural gas being burned to turn turbines. Waste heat generated by the process is not captured or used.

Smart Meter

A generic term for any meter capable of measuring both the amount of electricity consumed, and the time at which it was consumed. Some smart meters may have additional capabilities.

Spot Market

A market in which goods are traded for immediate or near-immediate delivery. In the IMO administered electricity market, bids to buy or sell electricity determine a market clearing price.

Spot Market Prices

The market clearing price determined in a spot market, and used as the basis of settlements for all purchases and sales in that market.

Supply Mix

The supply mix refers to the different types of fuel which are used to produce electricity in a particular jurisdiction. Normally the mix is expressed in terms of the proportion of each type within the overall amount of energy produced.

System Operator

The entity with the responsibility to monitor and control an electricity system in real time.

Time of Use Rates

Electricity rates which differ by time of day, day of week and season. Prices are higher when the demand for energy is highest. Typical peak hours are during weekday mornings and evenings. During low demand hours overnight and on weekends prices are lower.

Transmission

The movement or transfer of electricity energy or natural gas over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers, or is delivered to other, separate electric/gas transmission systems. Transmission of electricity is done at high voltages (50kV or higher in Ontario); the energy is transformed to lower voltages for distribution over local distribution systems.

Wholesale Market

The market in which electricity and other energy services are sold to directly connected customers, wholesalers, retailers, and distributors, who in turn sell to retail or end-use customers.

Wind Energy

Electricity produced from a system of airfoils or blades that spin a drive shaft to capture the kinetic energy of the wind.

APPENDIX 3

Who We Met

LEAD PRESENTER	REPRESENTING
Dan Allegretti	Constellation Power Source
Bruce Ander	Canadian Energy Efficiency Alliance
Judith Andrew	Canadian Federation of Independent Business
Greg Baden	Coral Energy
Dave Barrie	Hydro One
David Boileau	Superior Wind Energy Inc.
Bruce Boland	Ontario Power Generation
Ron Bonnett	Ontario Federation of Agriculture
John Brace	Independent Power Producers Society
Ian Cameron	RDII Utility Consulting
Jan Carr	Toronto Board of Trade
Debra Carey	Power Workers Union
Gunars Ceksters	Enersource Corp
Pierre Charlebois	Ontario Power Generation
Jason Chee-Aloy	Independent Market Operator
Mario Chiarelli	Ozz Corp
Barry Chuddy	The "DEEP" Group
Russell Chute	Ontario Energy Board
Mike Cleland	Canadian Gas Association
Tom Connel	Standard & Poors
Wayne Cousins	BC Hydro Powersmart
Ted Cowan	Ontario Federation of Agriculture
Duane Cramer	Sithe
Mike Crawley	Aim Power Generation

Anne Creighton	HydroOne
Aleck Dadson	Direct Energy
John Dalton	Navigant Consulting
Leo Desjardins	RETX Corp
Paul De Vries	Ontario Energy Saving Corporation
Corey Diamond	Greenest City
Carmine DiRuscio	Enersource
Peter Dyne	Consumers Association of Canada
Glen Estill	Wind Power Task Force
Matthew Fairlie	Stuart Energy
Barbara Fox	Enterprise Canada
Joan Frain	Ontario Power Generation
Marion Fraser	Fraser and Company
Roger Gale	GF Energy
Bob Gibbons	Independent Market Operator
Jack Gibbons	Ontario Clean Air Alliance
Harry Goldgut	Great Lakes Power
David Goldsmith	Ivaco
Mark Graham	Hydro One
Lauri Gregg	Falconbridge
Duncan Hawthorne	Bruce Energy
Ed Houghton	Electricity Distributors Association
David Hughes	Geological Survey of Canada
Joan Huzar	Consumers Council
Sasha Jacob	Dundee Capital
Bernie Jones	Ontario Energy Association
Sheila Kee	Schlumberger
Andrew Kuske	UBS Warburg
David Leith	CIBC
John LeMay	INCO

Peter Love	Canadian Energy Efficiency Alliance
Arnold MacBurnie	Coral Energy
Colin MacDonald	Cameco
Dean MacDonald	Rogers Cable
Dennis Maschmier	Sherritt International
Gadi Mayman	Ontario Financing Authority
David McFadden	Stakeholders' Alliance for Electricity Competition and Customer Choice
Rob McLeese	Access Capital
Betsy Mills	Ontario Energy Board
John Mitolo	Electric City
Barbara Mullally-Pauly	Natural Resources Canada
Larry Murphy	Consultant to the Association of Major Power Consumers (AMPCO)
Paul Murphy	Independent Market Operator
Michael Nobrega	Borealis Capital
Paul Norris	Ontario Waterpower Association
Geoff Ogram	Hydro One
Tom Parkinson	Hydro One
Jan Peeters	Olameter Corp
Arunas Pleckaitis	Enbridge
Rob Power	Powerbudd PLC
Courtney Pratt	Toronto Hydro
Steve Probyn	Probyn & Co.
Ken Quesnelle	Woodstock Hydro
Jim Richardson	CANBIO Association
Mary Ellen Richardson	Association of Major Power Consumers
Jane Rigby	CantorFitzgerald
Gregor Robinson	Ministry of Energy
Mitch Rothman	Navigant

Walter Schroeder	Dominion Bond Rating Service
Peter Sergejewich	Independent Market Operator
Amir Shalaby	Independent Market Operator
Mike Singleton	Sustainable Buildings Canada
Bill Sutherland	Manulife Financial
Doug Taylor	Ontario Power Generation
Don Thorne	Milton Hydro
Darius Vaiciunus	Collingwood Hydro
Robert Van Adel	Atomic Energy Canada Ltd.
Jeff Watkins	Hill & Associates
Howard Wetston	Ontario Energy Board
Martin Whicher	Ministry of Energy
Fiona Woolf	Cameron McKenna
Terry Young	Independent Market Operator
Nabila Yousef	DTE Energy Technologies
Rick Zebrowski	Toronto Hydro

We also wish to acknowledge the many letters and e-mails we received from interested consumers.